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STEEL

The Magazine of Metalworking and Metalproducing

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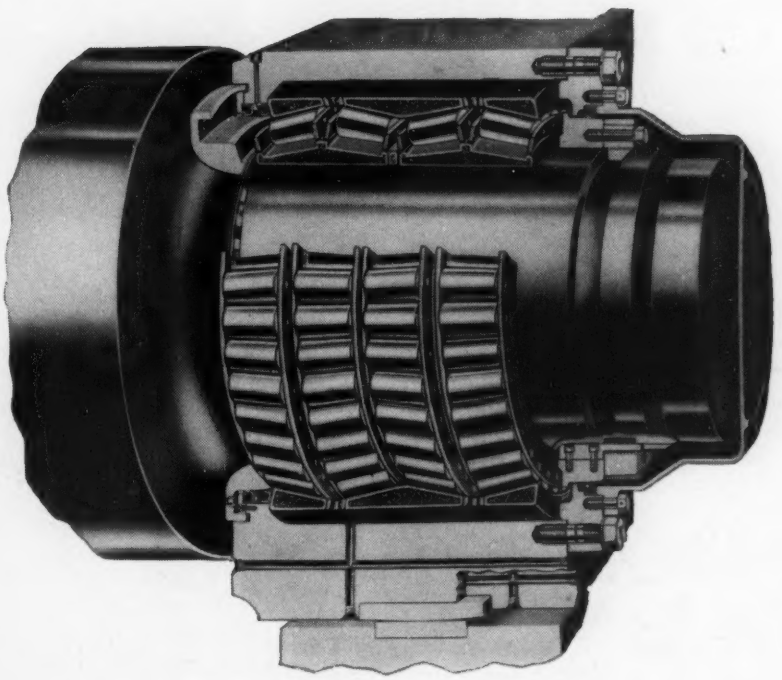
How TIMKEN® roll neck bearings give you greater mill rigidity... plus 7 other big advantages

BALANCED PROPORTION design of Timken® bearings contributes greatly to increased mill rigidity and minimizes deflection by permitting larger roll neck diameters than ever before possible with tapered roller bearings. Roll neck strength is increased 50 to 60%. But that's only *one* of the advantages you get with Timken roll neck bearings. Timken bearings give you all these advantages, too:



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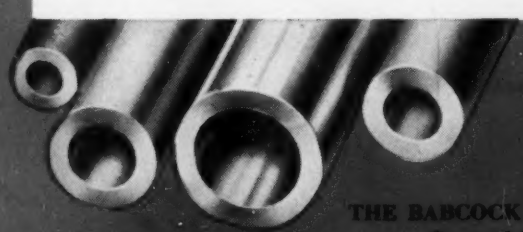

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STEEL

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April 10, 1950

Job Opportunities

According to reports from Washington one of the next drives on the agenda of the Truman administration is an attack on unemployment. The stage is being set for the big act by warnings to next June's graduates that they will find it difficult to obtain jobs and by estimates that unemployment will reach dangerous proportions by July. Assisting the administration in this stage setting are frequent blasts from American Federation of Labor and Congress of Industrial Organizations emphasizing the danger of excessive unemployment.

No reasonable person will discount the importance of abnormally high unemployment. It is a recurring problem which the nation thus far has failed to solve satisfactorily. At the same time, it is unwise to launch elaborate government programs to meet a situation that never materializes. Remember that after the war the government administration predicted wholesale unemployment. It geared much of federal domestic policy to an ambitious and costly anti-depression campaign. The unemployment and the depression failed to materialize. The government squandered billions on antideflation activities when it should have been working on anti-inflation measures.

This mistake should not be repeated. Nevertheless, the threat of excessive unemployment should not be taken lightly. If it is true, as some economists claim, that the available labor force is growing faster than employers' ability to provide jobs, then something better than government "make work" and "leaf raking" expedients should be developed to correct the situation.

This problem is vitally important to American industry and to every individual who believes in preserving our system of free enterprise. Nothing that can be said in favor of this great system carries much weight with a competent man or woman who after repeated, painstaking effort fails to find a job. Persons long out of employment are likely to become easy converts to the ideas of a "welfare state," socialism or even communism.

Hundreds of millions of dollars are spent annually extolling the virtues of private enterprise. Part of this sum could be spent to better advantage on a realistic study of the employment problem. A thorough trial might demonstrate that a million dollars spent on research on job opportunities will pay off better than two million spent on propaganda for private enterprise.

* * *

BETTER THAN EXPECTED: In view of the present outlook for industrial activity, some business analysts who went out on a limb last December with forecasts for 1950 now believe their predictions should be revised upward.

Four months ago well informed persons in motordom estimated that automobile production in 1950 would be from 5 to 12 per cent below that of 1949. Today some of these experts believe there is a chance that output this year may equal or even exceed that of last year. Their belief is bolstered somewhat by the spectacular record of the first quarter when, in spite of the coal and Chrysler strikes, the industry turned out 1.7 million cars and trucks. Moreover, April assemblies are almost certain to exceed those of March.

Department of Commerce and Securities & Exchange Commission estimate that outlays for new industrial plant and equipment in 1950 will total $16.09 billion. This would be a drop from a peak of $19.23 billion in 1948 and $18.12 billion in 1949. However, it is significant that actual expenditures for plant and equipment in the

(OVER)

fourth quarter of 1949 and indicated expenditures for the first quarter of 1950 are substantially higher than originally estimated. The agencies may find it necessary to revise their 1950 figure upward.

Building construction in some lines is exceeding early estimates by wide margins. All in all, the general industrial outlook is much brighter than informed persons dared hope a few months ago. —pp. 67, 73, 129

* * *

FREIGHT CAR FINANCING: For decades railroads desiring to purchase new freight cars have put up cash to cover about 20 per cent of their cost and have handled the balance through sale of equipment trust certificates. Today an alternative method is being tested. It is bound to attract attention from many quarters.

Equitable Life Assurance Society will order 1300 freight cars from Pullman-Standard Car Mfg. Co. and will take title to them. Atlantic Coast Line Railroad will lease the cars under a plan which calls for $1.15 per car per day for the first year. The rate drops thereafter for 15 years. After 15 years Equitable will have amortized its investment. Then the insurance company may lease the cars for 20 cents a day. New York Central is said to be negotiating with Equitable for a similar arrangement and other car builders are known to be interested in tying in with insurance companies on car orders.

It is a novel development in equipment financing which will bear close watching. —p. 55

* * *

NOVEL ROLE FOR WIRE: Since 1944 engineers of John A. Roebling's Sons Co. have been experimenting with an American version of prestressed concrete. This construction material is not a new idea; it was known as early as 1886. The basic concept of a prestressed concrete structure is to design it so that the concrete members always are under compression and under no circumstances can be subjected to tensile stresses. They can be kept in compression by means of steel reinforcing rods.

Roebling research has led to the use of galvanized bridge wire as the reinforcing material. Also Roebling engineers have steered away from the European practice of using bonded reinforcing members. One effective way is to pour the concrete slabs over tubes so that when the concrete sets galvanized wire or wire rope can be pulled through the tubes, anchored at the ends and drawn as tight as necessary to produce the amount of tension required to subject the concrete members to the desired compression stresses.

It is an interesting bit of development work inspired by a desire to create new markets for wire rope. —p. 100

* * *

POWERFUL ENOUGH NOW: CIO President Philip Murray's proposal to establish a joint committee of representatives of major unions with "authority to embark upon and pursue a common program" possibly is a logical step in the union movement, but it isn't likely to be adopted soon. Probably it will be blocked by the refusal of major union leaders to sacrifice the power they now hold for that in secondary positions in a union of unions.

Failure to organize a united front at this time may be a blessing in disguise for everybody. A union of unions would make union labor too strong for the good of the country and for the good of union members. The unions already have gained power faster than they have developed ability to employ it intelligently. They don't need more power now. What they do need is better leadership and organization to permit them to function more constructively. —p. 53

* * *

WHERE THE METALS GO: Census Bureau has just issued a report on the consumption of "metal mill shapes and forms and castings" by individual manufacturing industries. The figures are for 1947 and they cover steel, copper and copper-base alloys, and aluminum and aluminum base alloys.

The Census Bureau's attempt to show distribution of these products is similar to American Iron & Steel Institute's breakdown of distribution of finished rolled steel. The classifications of consuming industries differ somewhat, but the results for the comparable major industries are not too far apart. It is to be hoped that when feasible, distribution figures can be further refined so that tonnage now reported as going to an intermediary product such as bolts and nuts may be redistributed into its point of ultimate use, such as automobiles, or railroad cars. This would make the now valuable figures even more valuable. —p. 56

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

UNION OF UNIONS— CIO President Philip Murray's proposal for union unification is as welcome as snow in April to some labor groups, notably the AFL (p. 53). But snow in April does happen, so don't dismiss this latest move for unity by Mr. Murray as just another labor shenanigan. Action won't come tomorrow, but it may eventually. Labor leaders recognize the advantages unity will give to their long-range political and economic aims.

BUSINESS PROSPECTS— Good business is contagious—nearly everybody has it (pp. 67-73). STEEL's industrial production index reached an all time high in the week ended Apr. 1 when it hit 193 per cent of the 1936-1939 average. Steelmaking booms at 97 per cent of capacity. Freight carloadings will be up an estimated 1.4 per cent this quarter over the same 1949 period. Construction put in place in the first quarter totaled $4.4 million, a new record for those three months. Even without Chrysler, the auto industry rolled some 1.7 million cars and trucks from U. S. and Canadian plants in the first quarter (p. 67).

RAILROADS— Even the nation's No. 1 economic patient—the railroad and allied industries—may get shots in the arm from proposals for leasing freight cars and reducing freight damage (p. 55). Atlantic Coast Line Railroad will lease 1300 new cars under terms of the leasing plan worked out by Equitable Life Assurance Society and Pullman-Standard Car Mfg. Co. . . . Rail freight damage claims rose from $94 million in 1946 to $115 million in 1949 because of careless shippers and railroads. One Interstate Commerce Commissioner says that can be reduced by $90 million.

WHO USES WHAT?— More Census Bureau data is out to help you in your market analyses (pp. 56-57). The report shows who gets what steel and nonferrous products. No. 1 user of steel mill shapes and forms, for example, is the auto and auto parts industry. Electrical machinery makers are the biggest consumers of brass and wire mill shapes and forms of copper and copper-base alloys. More aluminum goes into fabricated metal products than into any other classification.

MOBILIZATION PLANNING— Watch the tempo increase in mobilization planning now that W. Stuart Symington has been switched from secretary of the Air Force to chairman of the National Security Resources Board (p. 60). NSRB has been without a permanent chairman since Arthur M. Hill resigned in December, 1948.

CARTELS— Belgian steel producers want to organize cartels—they call them "gentlemen's agreements"—in plates and wire rods (p. 64). German and other European steel firms are being sounded out. These discussions are preliminaries that may lead to a new cartel structure in western Europe. Spur to cartel talk is the threat of overproduction in European steel this year.

RUSSIAN PRODUCTION— Russia's production is gaining, but not as fast as ours (p. 64). Her pig iron output last year was 14 per cent above the 1940 level; ours was 26 per cent. Her steel ingot production was 15 per cent higher; ours rose 28 per cent. Her steel ingot output, at 23.3 million net tons last year, was 30 per cent of the 77.9 million tons we turned out in 1949. The main bottleneck in Russia to industrial expansion is a coal shortage.

HERE AND THERE IN INDUSTRY— Where there's smoke there's business for makers of combustion and heating equipment, Pittsburgh manufacturers find (p. 58) . . . There'll be more gas for industry when Tennessee Gas Transmission Co. finishes a $100 million program to expand its system's capacity (p. 59) . . . Pennsylvania Railroad will build an $8 million iron ore pier at Philadelphia (p. 55) . . . Studebaker Corp. estimates it made a profit of $1,950,000 on the investment in Empire Steel Corp.; what's more, it got steel during the shortage immediately after the war (p. 58).

Production-Engineering News—p. 81 Market Summary—p. 129

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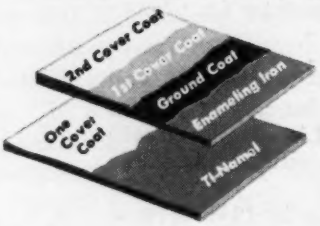

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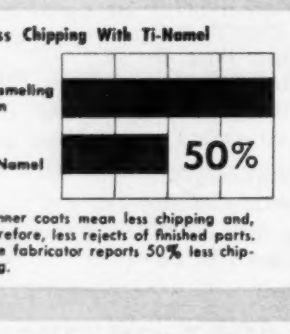

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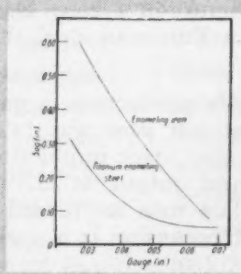

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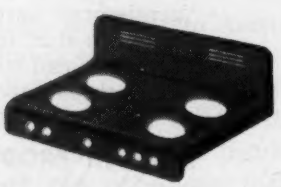

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STEEL
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Union of Unions Unlikely Now

Murray proposal, if adopted, would mean new labor party, rush toward socialism. But big labor leaders are unwilling to sacrifice their powers in unification move

THE union of unions proposed by CIO President Philip Murray, if successful, would bring an outright labor party into the American Political arena. Such a party, if it could command the backing of the 15 million union members, their families and a substantial number of unorganized laborers, could dominate the country. It could push us down the road to socialism at a faster clip.

But it isn't likely to happen soon.

This is the appraisal placed on the attempt by Mr. Murray to draw the American Federation of Labor, the United Mine Workers, the International Association of Machinists and the railroad brotherhoods into a joint organization for political and economic action.

Chilly Reception — You probably won't see Bill Green of the AFL or John L. Lewis of the UMW joining hands with Phil Murray in any real unification program for quite a spell. The reason: None is willing to sacrifice his own power as would be required by the union of unions.

AFL spokesmen already have cast a chill on the proposal. The AFL has refused to go along with similar unity pleas in other years.

Labor observers just can't see UMW Chieftain Lewis voluntarily giving up any of his authority over the coal miners to Mr. Murray, or vice versa.

The smaller unions likewise are jealous of their autonomy and their leaders are not anxious to become appendages to a larger union.

May Come Eventually — Although the proposal stands little chance of success immediately, or as long as the presently dominant figures in the big unions continue in their positions, don't underestimate the chances for its eventual success. The fact that the proposal bobs up periodically indicates it has considerable backing in the unions. Many thoughtful union leaders believe it offers the ultimate solution for labor to get what it wants.

Long-Term Aims—Many of these labor men, some of whom are in the secondary ranks of union leadership, have some pretty specific long-term aims for labor. And they believe a union of unions will be necessary to obtain these objectives.

What are these aims? One is described as "a voice in management." This is variously defined from labor members on directorates to labor acting in a consulting or advisory capacity to management. But labor leaders generally want a voice in management decisions affecting labor.

A second is regularization of production and employment. Sometimes this is expressed as a guaranteed wage. But many labor leaders agree that a guaranteed wage in the capital goods industries is not feasible and would be glad to work toward leveling off the peaks and valleys of production and employment.

There are others, but these two are considered front rank. And they are almost too big to be tackled by individual unions.

Not Organic Unity—Mr. Murray proposes the establishment of a joint committee of representatives of the major unions with "authority to embark upon and pursue a common program." The common program would be to obtain legislation and administrative action desired by labor.

The CIO president says the ideal way to meet the problem would be "organic unity of all labor."

"Pending organic unity, we must find the means, within the framework

Machines vs. Men—The Battle Continues

Labor Leader Murray says...

"The machine is displacing the man," CIO President Philip Murray laments.

He claims that the displacing of man by machines is fast pushing unemployment to the 5 million "danger mark" and warns that the "crisis" is getting worse by the day. He accuses industry of using its "bigger and bigger" profits on plant improvements, "not necessarily to increase production but to increase profit and per capita production."

He says organized labor favors new machines which improve man's lot, but "labor is not going to sit idly by to permit widespread introduction of machines to starve them to death."

Just like 1743

Tool Builder Ayr says...

"Mr. Murray's economic thinking is 200 years behind the times," charges David Ayr, president of the National Machine Tool Builders' Association.

"In 1743, in England, hand weavers threatened to mob Dr. Cartwright because of his power loom, but due to the loom, employment in the weaving industry has been increasing ever since.

"In 1845, in Massachusetts, workers in clothing shops organized to prevent the introduction of the sewing machine. The sewing machine since has given employment to millions. Good machines mean more employment, not less. Mr. Murray is preaching a doctrine disproved by experience."

of our existing organizational structures, to marshal our resources, strength and membership, in order to overcome the forces of reaction."

Benefits for Industry?—Some industrial observers believe a union of unions would have many advantages for business at the bargaining tables. They point out that currently many of the demands by the unions are attempts by one union to outdo its rivals rather than to obtain real benefits for the workers. More unity in the labor movement, they think, would diminish these political aspects of union demands.

Asking Demands Up

IUE-CIO to seek $125 pensions, wage increase, company financed insurance program

CONTRACT demands to be made by the IUE-CIO against the big electrical equipment producers point up the traditional union effort to outdo rivals in asking for benefits.

IUE-CIO will seek noncontributory pensions of $125 a month, company paid insurance, severance pay, and a "substantial" wage increase from Westinghouse, General Electric, General Motors and Sylvania.

These basic demands exceed the benefits won by the United Steelworkers and the United Auto Workers. In addition, the IUE-CIO is formulating other demands to be presented to individual companies. From Westinghouse, the union will ask a shorter work-week with no reduction in take-home pay, nine paid holidays, liberalized vacations and other benefits.

Contest for Representation—IUE-CIO is fighting the United Electrical Workers, which was booted out of the CIO last autumn for its communistic leadership, for representation in the major electrical equipment plants. Elections in 40 plants of Westinghouse, affecting 55,000 workers, have been scheduled by the National Labor Relations Board. IUE-CIO already has won representation elections in the Electrical Division of General Motors. Petitions for elections among 100,000 GE workers and 6750 employees of RCA-Victor are pending before the board.

Claim 300,000 Members—IUE-CIO claims to have 300,000 members, is hopeful of winning the elections in all the big plants.

The UE, before it was ousted by the CIO, claimed 400,000 members. Many of these have been lost to the IUE since the latter was chartered by the CIO last November.

UE is staging a bitter fight to hold its contracts. Several weeks ago it announced that it would seek wage increases of 10 cents an hour, $125 a month pensions, company-financed insurance programs and a shorter work-week.

Labor relations men believe the UE may be able to hold some of its contracts in the smaller plants by reason of strong local organizations.

IUE, UAW Work Together—The IUE signed an agreement Mar. 10 to extend the old UE agreement to May 28. This is the same date that the UAW contract with GM expires. IUE and UAW reportedly have agreed that neither union will sign with GM without the other's consent.

Chrysler Outlook Brightens

Following the retreat of the UAW-CIO from its insistence on a firm 6 cents per hour contribution to a funded pension plan, chances of settlement of the 75-day old Chrysler Corp. strike brightened again.

In its new proposal the union suggests the company "from time to time" make contributions to a pension trust fund in amount sufficient, based upon actuarial estimates, to fund future service credits in the initial five-year period, and to fund past service costs.

Changes in federal social security benefits would permit revision of estimates of future service costs and reallocation of the necessary contributions. Annual estimates would be furnished to the fund administrators by the company certifying the sufficiency of deposited funds to cover earned credits.

This is almost exactly what the company had already offered to do, with the possible exception of some question over just where pension funds are to be deposited.

Still to be resolved, however, are the matters of improved insurance protection and contract changes. These could come quickly if there is mutual agreement on pensions. It remains to be seen how the UAW can sell this hollow victory to 89,000 Chrysler workers who have lost close to $60 million in wages since they were told to walk out Jan. 25, or to the 50,000 idled in suppliers' plants for the same period at a wage loss of $30 million. All the issues could have been settled around the bargaining table, without the economic cruelty of forcibly suspending production.

Hairsplitting Job

Scientists at the Armour Research Foundation of Illinois Institute of Technology did a hairsplitting job that ought to pay off.

They developed a new method of making fine wire less than 1/10 the thickness of human hair. Dr. Howard T. Francis, supervisor of electrochemistry made the announcement. In the new method, he explains, wire passes through a chemical bath in which an electric current is flowing. The process polishes away the wire's surface.

Wire is normally made by drawing metal through successively smaller holes until a desired diameter is reached. In the new process, explains Dr. Francis, "the wire becomes an electrode in an electropolishing bath and is dissolved away to the desired size." More research is being carried on, though: Electrochemists would like to know how the process works with various metals and just how fine a wire can be made and used practically.

Steel Employment Rises

Steel industry's employment rose about 4000 in February but the total payroll was lower than in January because of the shorter month. The employment total was 613,400 in February, compared with 609,400 in January, says the American Iron & Steel Institute. February's payroll was $174,723,000, a decline from January's $189,346,000.

Wage earners worked an average of 38.8 hours a week during February, compared with 38.5 hours weekly a month earlier. Their hourly earnings average declined to $1.704 in February from $1.720 in January.

Skilled Labor Scarce

Shortage of engineering personnel and skilled machinists has reached critical proportions in the Detroit area. For months the government-operated Detroit Arsenal at Center Line, Mich., has been trying to hire automotive design engineers and journeymen machinists, without success. Automotive plants apparently have absorbed all available personnel in this field. Production increases on wheeled and track vehicles at the arsenal have created the need for additional help.

To Get Cars by Lease

Atlantic Coast Line first railroad to get equipment under Equitable rental plan

ATLANTIC Coast Line Railroad will lease 1300 new freight cars under terms of a leasing plan announced by Equitable Life Assurance Society (see STEEL, Apr. 3, p. 66).

New York Central Railroad is said to be negotiating with Equitable for a similar arrangement and probably will be the second major railroad to sign a leasing agreement.

Terms—It is reported the terms of the ACL lease call for $1.15 per day rental fee on each car during the first year of use. This rate would drop to $1.10 a day in the second year and would continue to decline in successive years. The cost of the car and financial status of the railroad will affect rental fees. Rates may be as high as $1.55 a day for the first five years, changing to $1.10 a day for the next ten years.

The Equitable lease contract is to run for 15 years; after that the cars may be further leased to the carriers at 20 cents a day. Equitable will recover the cost of the cars in 15 years, plus interest of at least 3 per cent on its investment. Initially Equitable will probably pay about 80 per cent of the cost of the car to Pullman-Standard Car Mfg. Co., the builder with whom it has an agreement. The balance will be payable on a deferred basis.

No Cash — The Equitable-Pullman plan relieves the railroads of the need for putting up cash at all. Previously railroads have had to put up 20 per cent of the cost of a new car in cash—a box car, for example, costs $5000 to $6000—the balance being handled through sale of equipment trust certificates.

Another feature of the plan is that railroads presumably will be able to charge off the daily car rentals for tax purposes. Normally freight cars are depreciated over 29 or 30 years. The effect of the rental plan on taxes would be similar to accelerated depreciation.

Join the Act—Other car manufacturers, such as American Car & Foundry Co., are known to be interested in entering into dealings with insurance companies for financing cars for railroad use. Leasing is designed to minimize fluctuations in demand for freight cars.

Pennsy To Build Ore Pier

Pennsylvania Railroad will build an $8 million iron ore pier at Philadelphia to participate in ore traffic when the material starts coming in volume from Venezuela, Brazil, Liberia and other foreign sources.

The action follows that of the Baltimore & Ohio Railroad which will build a similar pier at Baltimore. Both railroads figure that some of the ore will be freighted inland to Pittsburgh, Youngstown and Cleveland areas.

New Rates To Aid New England

New freight rates on some iron and steel products proposed by eastern railroads will cut New England consumers' costs an average of $2.40 per ton on the products affected. If the Interstate Commerce Commission agrees to the changes, the new rates will go into effect May 1.

Under proposed freight rates, producing points outside New England that will have the most favorable rates are Conshohocken, Pa., and Trenton, N. J. Alan Wood Steel Co. has just begun operating a new 30-inch hot strip mill at Conshohocken. Producers at Trenton are John A. Roebling's Sons Co. and the U. S. Steel Corp. subsidiaries, American Steel & Wire Co. and American Bridge Co.

The new rates will further widen many differential advantages already prevailing for eastern and Buffalo mills over Pittsburgh. From Sparrows Point, Md., the decline in freight to Boston, Worcester, Mass., and Hartford, Conn., amounts to $2.40 per ton.

The reduction from Pittsburgh to Boston is $1.60; to Worcester, $2; to Hartford, $2.20. Rate from Buffalo to Boston will be $2.20 lower; to Worcester, $2.40; to Hartford, $2.60.

CONGRATULATIONS IN CONSHOHOCKEN: John T. Whiting (left), president of Alan Wood Steel Co., is congratulated by Revelle W. Brown, president of Reading Co., during the first public inspection of Alan Wood's new 30-inch hot-rolled strip mill. The affair was attended by more than 1000 industrialists from all over the United States

Freight Damage Ups Costs

Crucible traffic manager urges industry and railroads to reduce economic waste

RISING rail freight damage claims are among the factors boosting your freight bills—and your general costs.

Freight damage claims rose from $94 million in 1946 to $115 million in 1949, says Henry H. Pratt, general traffic manager of Crucible Steel Co. of America and president of the Atlantic States Shippers Advisory Board. Industry must pay for this freight claim bill—much of the damage is avoidable—through higher shipping costs, loss of time and interrupted production. Both careless shippers and the railroads are at fault.

Your Chance To Cut Costs—One Interstate Commerce Commissioner says the freight claim account could be reduced by $90 million a year. Mr. Pratt thinks that figure is too optimistic, but he does say it can be reduced substantially by:

1. Modernizing and simplifying complicated and outmoded railroad loading rules.
2. Improving training and education of railroad personnel.
3. More co-operation between railroad and industrial traffic men.
4. Better consultative advice to industry from the railroads.
5. Analytical study by industry as to why and how products are damaged.

Crucible claims for outbound shipping damages in 1949 were 42 per cent less than in 1948. Total claims for both inbound and outbound shipments were one third less than in 1948. This was accomplished by forming a committee to study and seek solutions to all package construction, loading, bracing and securement problems.

Barco Buys Valve Pilot Corp.

Barco Mfg. Co., Chicago, maker of joints and fittings, has acquired Valve Pilot Corp., New York, manufacturer of locomotive specialties.

Metal: Who Gets It and How Much

Metalworking plants' take of steel, copper and copper-base alloys, and aluminum and aluminum-base alloys analyzed in new report of Census Bureau

IN STUDYING steel distribution figures did you ever wonder just how much of a certain product went into metalworking plants and how much went to other consumers such as the construction industry and railroads?

You can get that answer and a lot of other allied data from a Census Bureau report just issued. A part of the Census of Manufactures, it's entitled "Consumption of Metal Mill Shapes and Forms and Castings by Individual Manufacturing Industries—1947," and is designated as series MC100-12. It's a companion to "Geographic Distribution of Consumption of Metal Mill Shapes and Forms and Castings — 1947" issued several months ago and reported in STEEL, Jan. 23, p. 30.

Pattern Holds—The fact the report is for 1947 does not eliminate its usefulness as a basis for calculations concerning other nearby peacetime years, for the pattern of one year's distribution is quite similar to that of another.

The report on consumption by industries shows manufacturing plants' take of materials was like this:

1. Steel—39,383,069 tons of mill shapes and forms, or 62.46 per cent of the 63,057,150 tons of finished steel shipped by mills.

2. Copper and Copper-Base Alloys—873,816 tons, or 45.70 per cent of all rolled, drawn, and extruded shapes and forms shipped by brass and wire mills.

3. Aluminum and Aluminum-Base Alloys—360,183 tons, or 51.48 per cent of all rolled, drawn, and extruded shapes shipped by mills.

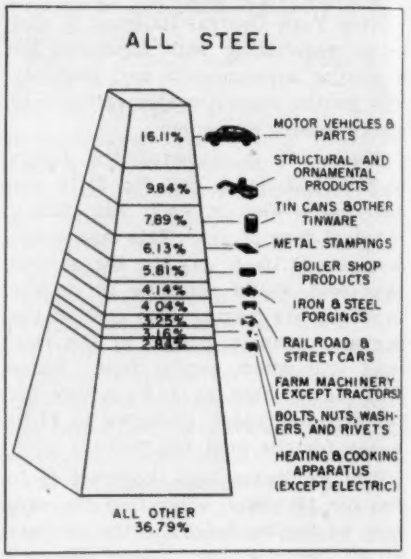
Autos No. 1 User—Largest industrial consumer of steel mill shapes and forms in 1947 was the motor vehicle and parts industry. It took 6,344,400 tons, or 16.11 per cent of all finished steel going to manufacturers.

The next nine manufacturing consumers, the tons of steel they used and the percentage these tonnages are of total finished steel shipped to manufacturing plants follow:

Structural and ornamental prod-

They're Tops

... among factories using steel



How Metalworking Plants Rank as Carbon Steel Consumers

BARS & BAR SHAPES
MOTOR VEHICLES & PARTS 13.44%
STRUCTURAL & ORNAMENTAL PRODUCTS 11.06%
FARM MACHINERY (EXCEPT TRACTORS) 11.01%
IRON & STEEL FORGINGS 10.67%
BOLTS, NUTS, WASHERS AND RIVETS 8.36%
TRACTORS 4.41%
RAILROAD & STREETCARS 3.17%
CONSTRUCTION & MINING MACHINERY 2.81%
SCREW MACHINE PRODUCTS 2.74%
METAL DOORS, SASH & TRIM 2.65%
ALL OTHER 29.68%
SHEET AND STRIP
MOTOR VEHICLES & PARTS 29.49%
METAL STAMPINGS 12.15%
HEATING & COOKING APPARATUS 6.16%
METAL BARRELS, DRUMS & PAILS 5.22%
REFRIGERATION MACHINERY 4.62%
SHEET METAL WORKS 4.50%
STRUCTURAL & ORNAMENTAL PRODUCTS 3.01%
BOILER SHOP PRODUCTS 2.66%
FARM MACHINERY (EXCEPT TRACTORS) 2.50%
HARDWARE 2.40%
ALL OTHER 27.29%
STRUCTURAL SHAPES
STRUCTURAL & ORNAMENTAL PRODUCTS 60.88%
RAILROAD & STREETCARS 11.47%
BOILER SHOP PRODUCTS 5.31%
CONSTRUCTION & MINING MACHINERY 4.53%
SHIP BUILDING & REPAIRING 2.92%
FARM MACHINERY (EXCEPT TRACTORS) 1.88%
CONVEYORS 1.65%
OIL-FIELD MACHINERY & EQUIPMENT 1.35%
TRUCK TRAILERS 0.86%
TRACTORS 0.84%
ALL OTHER 8.31%
PLATES
BOILER SHOP PRODUCTS 32.45%
STRUCTURAL & ORNAMENTAL PRODUCTS 12.19%
RAILROAD & STREETCARS 11.14%
SHIP BUILDING & REPAIRING 9.50%
CONSTRUCTION & MINING MACHINERY 6.34%
MOTOR VEHICLES & PARTS 3.15%
SPECIAL-INDUSTRY MACHINERY 1.79%
METALWORKING MACHINERY 1.69%
MOTORS & GENERATORS 1.68%
HEATING & COOKING APPARATUS 1.57%
ALL OTHER 18.50%
WIRE
WIREWORK 44.83%
BOLTS, NUTS, WASHERS AND RIVETS 29.05%
ELECTRICAL WELDING APPARATUS 8.20%
MOTOR VEHICLES & PARTS 2.72%
HARDWARE 2.14%
STRUCTURAL & ORNAMENTAL PRODUCTS 1.24%
METAL STAMPINGS 1.14%
NAILS & SPIKES 1.13%
FARM MACHINERY (EXCEPT TRACTORS) 0.90%
BALL & ROLLER BEARINGS 0.87%
ALL OTHER 7.78%

ucts, 3,874,821 tons, 9.84 per cent; tin cans and other tinware, 3,106,461 tons, 7.89 per cent; metal stampings, 2,412,785 tons, 6.13 per cent; boiler shop products, 2,289,266 tons, 5.81 per cent; iron and steel forgers, 1,630,208 tons, 4.14 per cent; railroad and street cars, 1,592,878 tons, 4.04 per cent; farm machinery, except tractors, 1,278,347 tons, 3.25 per cent; bolts, nuts, washers and rivets, 1,243,783 tons, 3.16 per cent; and heating and cooking apparatus, except electrical, 1,118,650 tons, 2.84 per cent.

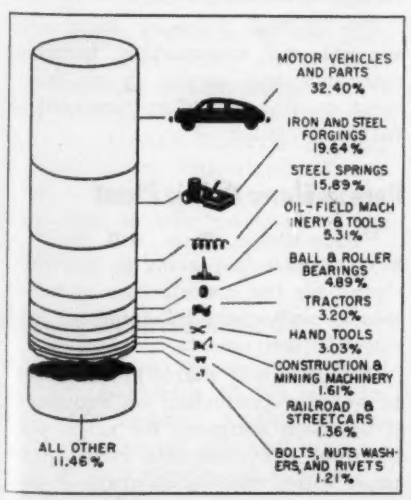
Who Gets What—Of each of five carbon steel products for which the report gives consumption data the bulk went to ten manufacturing groups, as indicated in an accompanying chart. Ten groups, although not the same ones in each case, used 70.32 per cent of the carbon bars and bar shapes going to manufacturing plants, 72.71 per cent of the carbon sheet and strip; 91.69 per cent of the carbon structural shapes; 81.50 per cent of the carbon plates; and 92.22 per cent of the carbon steel wire.

Of the 4,479,185 tons of alloy steel (except stainless) shipped in 1947 from mills 55.28 per cent, or 2,475,945 tons, went to manufacturing plants. The 2,475,945 tons consisted of 1,673,154 tons of bars and bar shapes and 802,791 tons of all other mill shapes and forms of alloy (except stainless). Largest ten consuming groups took 88.54 per cent of the alloy bars and bar shapes (except stainless) distributed to manufacturing plants.

Stampers Take Stainless—Stainless steel going to manufacturing consumers totaled 197,851 tons, or 53.83 per cent of the 367,554 tons of stainless shipped by mills in 1947. The ten largest consuming groups, led by the metal stampings classification, used 59.65 per cent of the stainless steel distributed to manufacturing plants.

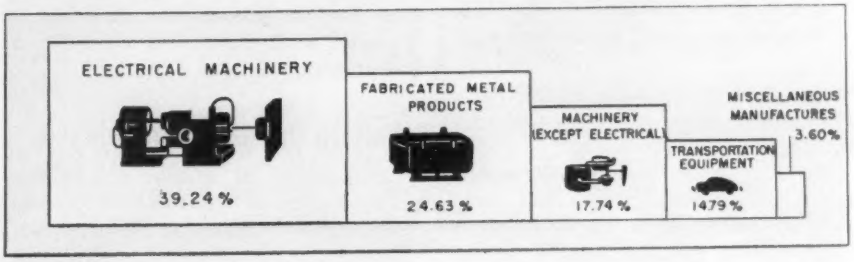
Leaders Among Plants

. . .using alloy bars, bar shapes


MOTOR VEHICLES AND PARTS 32.40%
IRON AND STEEL FORGINGS 19.64%
STEEL SPRINGS 15.89%
OIL-FIELD MACHINERY & TOOLS 5.31%
BALL & ROLLER BEARINGS 4.89%
TRACTORS 3.20%
HAND TOOLS 3.03%
CONSTRUCTION & MINING MACHINERY 1.61%
RAILROAD & STREETCARS 1.36%
BOLTS, NUTS WASHERS, AND RIVETS 1.21%
ALL OTHER 11.46%

How Metalworking Plants Rank

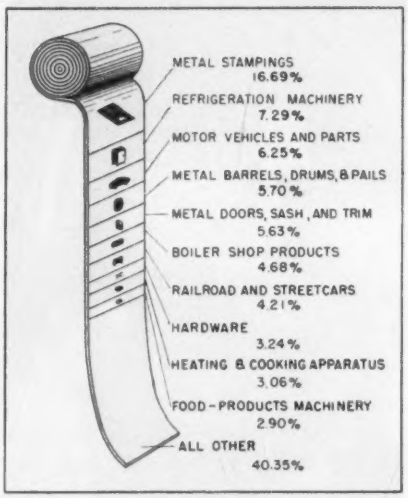
. . . as consumers of mill shapes of copper and copper-base alloys



Manufacturers using brass and wire mill shapes and forms of copper and copper-base alloys fall into five broad groups as shown in an accompanying chart. Listed in the order of importance are: 1. Electrical machinery; 2. fabricated metal products; 3. machinery, except electrical; 4. transportation equipment; and 5. miscellaneous manufactures.

Ten Best Customer Groups

. . . among plants using stainless


METAL STAMPINGS 16.69%
REFRIGERATION MACHINERY 7.29%
MOTOR VEHICLES AND PARTS 6.25%
METAL BARRELS, DRUMS, & PAILS 5.70%
METAL DOORS, SASH, AND TRIM 5.63%
BOILER SHOP PRODUCTS 4.68%
RAILROAD AND STREETCARS 4.21%
HARDWARE 3.24%
HEATING & COOKING APPARATUS 3.06%
FOOD-PRODUCTS MACHINERY 2.90%
ALL OTHER 40.35%

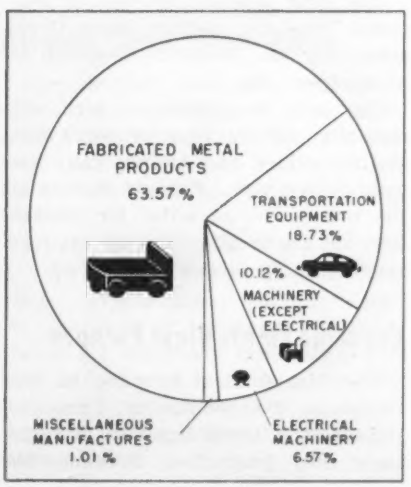
Where the Copper Goes—Further breakdown shows the first ten consuming groups of rolled, drawn, and extruded shapes and forms from brass and wire mills to be the following (along with the percentage taken): 1. Insulated wire and cable, 16.41; 2. motor vehicles and parts, 13.59; 3. valves and fittings, except plumbers', 6.50; 4. metal stampings, 4.98; 5. motors and generators, 4.46; 6. engine electrical equipment, 4.32; 7. transformers, 3.99; 8. screw machine products, 3.89; 9. metal plumbing fixtures and fittings, 3.87; and 10. bolts, nuts, washers, and rivets, 3.46. Those ten groups accounted for 65.47 per cent of all rolled, drawn, and extruded copper and copper-base alloy shapes and forms shipped by brass and wire mills to consuming manufacturers.

Aluminum to Fabricators—Of five broad groups consuming rolled, drawn, and extruded mill shapes of aluminum and aluminum-base alloys, the largest is "fabricated metal products." It takes 63.57 per cent of all aluminum mill shapes going to manufacturing plants. Other four of the five groups in the order of importance are: Transportation equipment; machinery, except electrical; electrical machinery; and miscellaneous manufactures.

Analysis of these five broad groups shows that within them the ten leading classifications of consumers of mill shapes of aluminum and aluminum-base alloys (along with the percentage taken) are: 1. Sheet-metal work, 29.22; 2. metal stampings, 17.66; 3. aircraft, 7.28; 4. motor vehicles and parts, 5.97; 5. refrigeration machinery, 4.68; 6. heating and cooking apparatus, 4.62; 7. metal doors, sash, and trim, 4.34; 8. electrical appliances, 1.51; 9. domestic laundry equipment, 1.37; and 10. radios and related products, 1.11. Those ten groups accounted for 77.76 per cent of all shapes of aluminum and aluminum-base alloys shipped by mills to manufacturers.

Aluminum Mill Shapes:

. . . distribution to plant groups



Smoke Means Business

Combustion equipment sales good in Pittsburgh where smog control program is underway

WHERE there's smoke there's business—for makers of combustion and heating equipment.

Sales of smokeless heating equipment for industrial plants and commercial buildings in the Pittsburgh district have climbed steadily during the past four years as the city's smoke elimination program resulted in an estimated 65 per cent reduction of atmospheric contamination.

Gas and Oil—Nearly 10 times as many gas or oil-fired steam boilers were supplied the area by Dravo Corp. in 1949 as in 1945. More than 250 Dravo warm air space heaters have been installed in the Pittsburgh industrial district during the past four years. All are gas or oil-fired.

A survey by Dravo's Combustion and Heating Depatrments shows an increasing trend toward installation of gas or oil-burning steam boilers and warm air space heaters for new structures or to replace outmoded equipment. Another trend in Pittsburgh, says Dravo, is toward the use of combination gas and oil burners for heaters and steam boilers. On either type of equipment, combination burners permit a quick changeover from one fuel to the other.

No Smoking—In addition to this equipment, a number of Pittsburgh industrial firms have installed apparatus to prevent fly ash produced by large coal-burning steam boiler plants. There has also been increasing use of stokers and boiler control apparatus on coal-fired steam generators to achieve better combustion of the solid fuel and comply with smoke control regulations.

New Pipe Mill in Operation

The new pipemaking mill of National Tube Co., a U. S. Steel Corp. subsidiary, has gone into operation at McKeesport, Pa.

The mill is geared to turn out annually 100,000 tons of large-size, electric-welded and hydraulically expanded steel pipe. First production at the mill is on an order for 30-inch size, but the facility can turn out pipe ranging to 36 inches in diameter.

Carnegie Lights Blast Furnace

The No. 6 blast furnace at the Duquesne, Pa., works of Carnegie-Illinois Steel Corp. has been brought back into production because the U. S. Steel Corp. subsidiary needs more hot iron in steelmaking furnaces.

All six blast furnaces at Duquesne are now in production. The No. 6 furnace went down last June for a relining.

Weirton Oxygen Plant Delayed

Completion of a 400-ton per day oxygen plant at Weirton Steel Co. has been delayed, says E. T. Weir, chairman of the parent company, National Steel Corp. This is attributed to fact that an oxygen plant of this size is an entirely new venture. Time was taken for the redesign of equipment when progress of construction revealed opportunities for improvement that were not apparent in the drafting-board stage. Operation of the oxygen plant is expected to begin in May.

100 Years in Ore Business

Cleveland-Cliffs Iron Co., Cleveland, is observing its one hundredth anniversary this year. To commemorate its beginning on the Marquette range near the present cities of Ishpeming and Negaunee, Mich., the company will hold an appropriate observance on that range later this year.

NEA

BELL-LIKE NOZZLES — Air blasting through these bell-like nozzles, mounted on a wall separating two airtight chambers, enables scientists to compute with great accuracy the volume of airflow per minute put out by experimental jet engine compressors. The compressors under test forces air into one of the chambers and enough of the nozzles are unplugged to let the air flow from one chamber to the other. How is airflow measured? By the number of nozzles opened and by the drop in pressure between chambers

Makes Profit on Empire

How profitable was it for a consumer to buy a steelmaking plant as a means of getting sufficient steel during the postwar steel shortage?

For Studebaker Corp., South Bend, Ind., it provided an estimated profit of $1,950,000 on original investment.

Studebaker purchased Empire Steel Corp., Mansfield, O., on Dec. 31, 1947, for $7,430,000 in cash. On Dec. 31, 1949, Studebaker sold the Empire facility to a newly organized company, which continues to operate under the name of Empire Steel Corp. On this sale Studebaker sustained a loss, which after tax effect, amounted to approximately $950,000. However, earnings of the Empire business, during the two years of operation under Studebaker ownership, were such that the net effect of the purchase, operation, and sale, is an estimated profit to Studebaker of $1,950,000 on original investment.

In retrospect, Studebaker says: "Throughout 1948 and well into 1949, our ability to draw upon the steelmaking capacity of Empire was of great help in maintaining and increasing our production."

Stokes Expands Product Line

F. J. Stokes Machine Co., Philadelphia, has entered the vacuum metallizing field.

Stokes will furnish complete-package installations for firms that wish to coat with metal such products as plastics, crystals, glass, paper, textiles, lenses and optical parts, light reflectors, jewelry and automotive insignia. Metallizing installations consist of vacuum chambers, vacuum pumping units, complete product mounting assemblies and complete vacuum instrumentation.

The Stokes Advisory Service is available for consultation, technical assistance and service in pre-treatment, coating and after-treatment of various products.

Perkin-Elmer Builds Plant

Perkin-Elmer Corp. will build a 50,000-square-foot plant in Norwalk, Conn., for the manufacture of aerial lenses, photographic equipment and scientific instruments.

The plant will enable Perkin-Elmer to go into production on equipment it has been designing for aerial photography. Developments include telephoto lenses which photograph ground

objects from altitudes of 40,000 feet and higher and a panoramic camera that can photograph 180 degrees of the horizon at one exposure.

Ground will be broken soon. By late fall the company's present three installations—executive offices and optical manufacturing plant in Glenbrook, Conn., instrument shop in Stamford, Conn., and engineering laboratory in Elmhurst, N. Y.—will move to Norwalk.

Sylvania Develops Clad Wire

Sylvania Electric Products Inc., New York, has developed heat-resistant, nickel-clad copper wires which provide the electrical conductivity of copper combined with the heat and corrosion-resisting properties of nickel.

The wire will be useful in incandescent lamps of high wattage and electron tubes. Stranded conductors of nickel copper also are finding increasing applications in electrical lead wire for aircraft, electric furnaces, home appliances and laboratory equipment.

Sylvania's Parts Division is specializing in diameters ranging from 0.010 to 0.115 inch that are particularly well suited for high temperature applications where copper wire becomes brittle and unworkable.

Vapor Car Buys Montreal Plant

Vapor Car Heating Co. of Canada Ltd., an affiliate of Vapor Heating Corp., Chicago, has purchased a second plant in Montreal, Que. This facility will be used to manufacture Vapor steam generators for Canadian railroads.

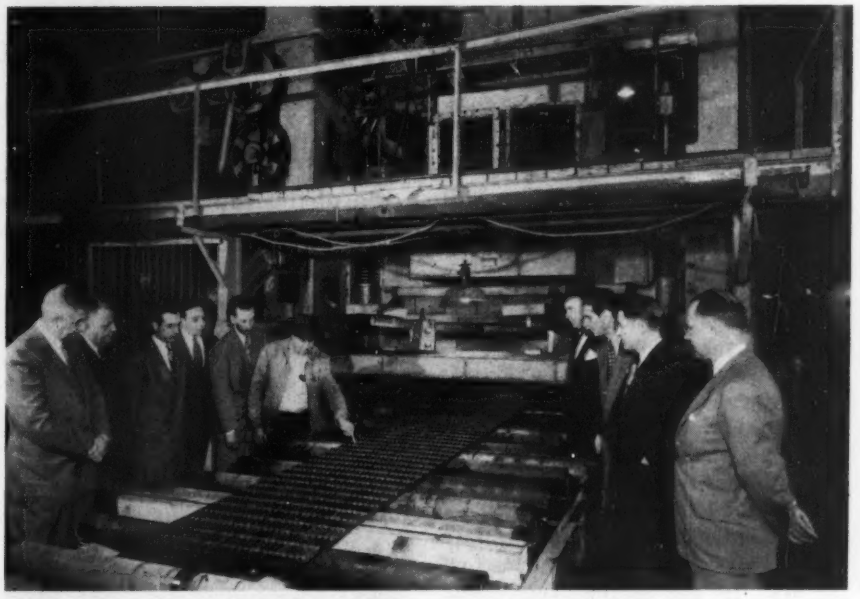
The company's high speed boilers are installed in diesel locomotives to supply necessary steam for heating passenger cars on diesel powered trains.

Alabama Firm To Make Tubing

Southeastern Metals Co. will start producing steel tubing for furniture and other uses in Birmingham within three months. Southeastern will occupy the former Alabama Foundry Co. building on 35th street. Robert T. Harris is president and Robert A. McMasters is vice president of the company.

Admiral Buys Midwest Co.

Admiral Corp. has bought Midwest Mfg. Co., Galesburg, Ill. No purchase price was disclosed. Midwest makes kitchen equipment and will continue to do so as a division of Admiral.



80 WELDS UNDER UNIFORM PRESSURE: John Selznick, industrial engineer of Reliance Steel Products Co., McKeesport, Pa., explains to Levinson Steel Sales Co., Pittsburgh, executive sales personnel how this hydraulic press makes 80 electric welds under uniform pressure in making industrial grating. Grating made by this process can be from steel, ferrous alloys or aluminum alloys. National distribution of Reliance gratings was taken over by Levinson Steel Sales Co.

More Gas for Industry

Tennessee Gas Transmission Co. starts $100 million program to boost capacity

TENNESSEE Gas Transmission Co. is starting a $100 million construction program for 1950 this month, says Charles S. Coates, vice president in charge of operations.

The program is designed to increase the Tennessee system capacity to 1060 million cubic feet per day from the present 710 million cubic feet and to extend the present Rio Grande-to-West Virginia line into the Appalachian area. Total length will be increased from 1365 to 1750 miles.

To increase capacity, the company will lay 526 miles of 30-inch and 100 miles of 26-inch pipe parallel to existing systems at various points in Texas, Louisiana, Arkansas, Mississippi, Tennessee and Kentucky. Additional gathering lines will be laid in Texas. Extending the reach of the system, a 385-mile main line extension of 26-inch pipeline from Greenup county in Kentucky across eastern Ohio and northwestern Pennsylvania to near Buffalo will be laid. A new line to near Pittsburgh also will be built. Extensions will be ready for next winter.

Warehousemen To Meet

American Steel Warehouse Association will hold its 41st annual meeting at the Shamrock, Houston, Apr. 27-28.

A considerable range of discussion subjects is listed. These include: Government and business; postwar steel merchandising; steel barging; safety; imports; steel finances; warehouse industry's scope; warehousing practices.

Speakers will be: Lowell B. Mason, acting chairman, Federal Trade Commission; L. S. Hamaker, sales manager, Republic Steel Corp.; Capt. A. C. Ingersoll Jr., president, Inland Barge Co.; Randolph Hyde, treasurer, Carnegie-Illinois Steel Corp.; H. B. Ressler, vice president, Joseph T. Ryerson & Son Inc.; C. H. Bradley, president, W. J. Holliday & Co.; and Walter S. Doxsey, association president.

Atlantic Steel Open House

Agricultural implement manufacturers from 18 different cities have already announced that they will exhibit their products at Atlantic Steel Co.'s open house in Atlanta, Ga., May 5-6.

"Dixisteel on Dixie Farms" will be the overall theme of the open house. The occasion will emphasize the variety of products Atlantic makes for southern farms and the wide range of prime materials and fabricated parts it supplies to manufacturers of agricultural machinery and equipment.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Should standby legislation for total mobilization be authorized at this time? That's just one of the fundamental questions W. Stuart Symington must answer as new NSRB head

SWITCH of W. Stuart Symington from the secretaryship of the Air Force to the chairmanship of the National Security Resources Board can mean one thing:

The tempo of total mobilization planning—which has been limping along since Arthur M. Hill resigned from that job in December of 1948—is to be accelerated.

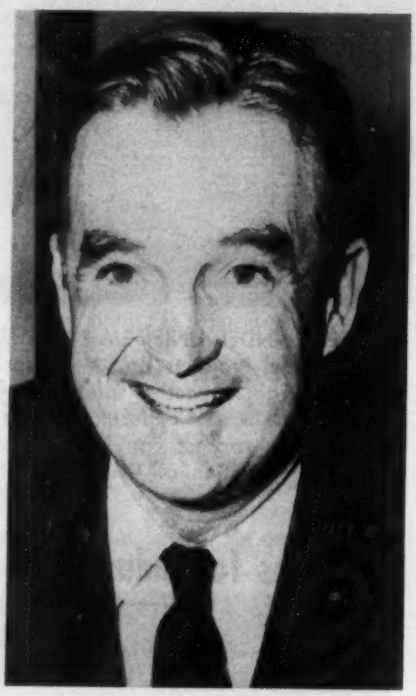
Mr. Symington is a good man for the job: He has occupied important Washington posts since 1941. In 1945 President Truman appointed him chairman of the War Surplus Property Board. In September, 1947, he became the first secretary of the Air Force.

His move is of significance to industry. Through contacts with the Munitions Board, industry has some idea of military interests, but it has only the most nebulous ideas about how it would be affected under total mobilization.

Two Fundamentals—The immediate task before Mr. Symington is to advise President Truman on two matters of fundamental importance: 1. Whether standby legislation authorizing total mobilization should be asked of Congress at this time. 2. Whether government departments or agencies should be authorized at this time to set up nucleus organizations for effecting total mobilization when the time comes.

Cadres—It was the controversy over the last point that led to Mr. Hill's resignation. He had gone ahead with a blueprint embodying the so-called "Eberstadt" plan, under which NSRB would create within its own walls the cadres of a future War Production Board, Office of War Manpower, Office of Price Control, etc. Straightaway other government units — Commerce and Agriculture, for instance, objected; they wanted to handle their particular areas of the total mobilization job in another war. The upshot was: President Truman decided to do nothing as of that time. And Mr. Hill decided he had outlived his usefulness in the job.

Contrary to general impression, the NSRB, under John R. Steelman as acting chairman, has accomplished some work. Mr. Steelman has followed a policy of delegating tasks to various government entities —Bureau of Mines, Commerce Department, Agriculture Department and others. As a result, some parts of the planning job have been well advanced. Right now government lawyers are making the fourth revision of the bill to give the President necessary mobilization and control powers for another war.



W. STUART SYMINGTON
. . . two tasks before him

Fear of Freeze — Until now, the White House view has been against asking Congress to approve this as standby legislation (there's a fear of freezing legislative concepts that later might require revision). This situation will be reviewed by Mr. Symington, who will report to the President with recommendations.

The standby measure in its present form has these principal titles: Industrial mobilization, manpower mobilization, control of prices and wages, rationing of food and scarce commodities, freezing of inventories of many consumer and durable goods, curbing credit, civilian defense, and a fiscal program combining a tax load and forced savings plans to drain off excess purchasing power.

Phantom Orders—Lately the NSRB has given more consideration to placing so-called "phantom" orders for equipment that will be required in large quantities in another war. The idea is to enable manufacturers, through provisional orders placed by Reconstruction Finance Corp. at the instance of the NSRB, to get organized now for the production jobs on which they will get busy on a future M-Day.

Such phantom orders already have been placed for machine tools, cutting tools and gages. In recent months consideration has been given to the adoption of the phantom order technique or some variant of it in connection with foundry equipment, heating and heat treatment equipment, etc. Some types of equipment cannot be given the phantom order treatment: Electronic equipment, for instance was not eligible for phantom orders because it becomes obsolete too rapidly.

Ore on Seaway?—Another decision to be made by Mr. Symington is whether to send NSRB representatives to testify in the St. Lawrence seaway hearings to be held by the House Public Works Committee starting Apr. 24. NSRB has decided views that the seaway is vital to permit entry of foreign iron ore—particularly that from the Labrador-Quebec field —into the Great Lakes, not only in time of emergency but in normal times.

Previous plans had called for development of this story largely by the Commerce Department.

RFC Loans to Metalworking

New loans by Reconstruction Finance Corp. to companies in the metals field include:

Jessop Steel Co., Washington, Pa., producer of steel specialties, light armor plate and composite clad metals, $1 million, for nine years, for working capital and debt payment.

Northrup Aircraft Inc., Hawthorne, Calif., airplane manufacturer, $5.8 million for four years and nine months, for working capital and debt payment.

Delta Tank Mfg. Co. Inc., Baton Rouge, La., steel fabricator, $500,000 for ten years, for working capital.

American Fixtures & Mfg. Co., St. Louis, manufacturer of chromium-plated display fixtures and furniture, $1.7 million for seven years, for new

construction, machinery and working capital.

Martin Bros. Box Co., Toledo, O., manufacturer of wire-bound shipping containers, $725,000 for five years, for machinery and working capital.

New Haven Clock & Watch Co., New Haven, Conn., watch manufacturers, $1 million for five years, for working capital.

Patent Button Co., Waterbury, Conn., manufacturer of machine-attached metal buttons and snap fasteners, $600,000 for seven years, for working capital and debt payment.

Highway Trailer Co., Edgerton, Wis., manufacturer of trucktrailers, public utility line construction and maintenance equipment, $1 million, for five years, for working capital and debt payment.

Graham-Hoeme Plow Co. Inc., Amarillo, Tex., manufacturer of plows and farm implements, $2.4 million, for five years, for working capital.

Ship Repair on Rocks

"It is necessary to tide the ship repair industry over a crucial period of adjustment; this industry must be preserved in the interest of national defense."

So says Charles D. Marshall, general manager of the Maritime Commission. The commission wants $25 million appropriated for fiscal 1951 for drydocking, surveying, inspecting and repairing 134 cargo vessels in the "mothball" fleet. Unless such help is given, the merchant marine subcommittee of the Senate Interstate & Foreign Commerce Committee was told, the industry will vanish.

Mr. Marshall told the subcommittee that ship repair employment fell from 78,762 in March, 1948, to 22,157 in December, 1949. He says an appropriation of $25 million would provide employment for 4500 to 5000 ship repair workers for one year.

Lightweight Generator

Navy's Bureau of Yards & Docks has a 60-kw generator that weighs only 3300 pounds—about half the weight of standard generators of that capacity. It was developed under a program to lower the weight of airborne equipment.

The new generator's high-speed diesel engine utilizes lightweight alloys and is insulated with silicon. The generator supplies a 60-cycle, three-phase, four-wire, dual voltage system rated at either 120/209 volts or 240/416 volts.

The unit is made by Detroit Diesel Division of General Motors Corp.; it is 107 inches long, 69 inches high and 35 inches wide. It underwent a thousand-hour trial in California and is soon to undergo Arctic tests.

Build Things for Homes?

New opportunities for large-scale business in all items that enter into the construction of home units are being nudged in sight by operation of the Housing Act of 1949.

Public Housing Administration reports that in the eight months since the start of the program it has received 557 applications for 409,700 low-rent dwellings to be developed in 38 states, the District of Columbia, Hawaii, Puerto Rico, the Virgin Islands and Alaska. PHA already has allocated 286,000 such dwellings to be built by housing authorities in 473 cities, towns, or counties under terms of the 1949 act. Preliminary loans of $45,539,000 already have been approved to cover planning of 256,405 of these units in 392 localities; these loans will finance planning of low-rent housing, for more than 1 million persons in low-income families, whose construction is expected to cost around $2180 million. All but five states—Wyoming, Utah, Oklahoma, Iowa and Kansas—now have passed enabling legislation for participation in the low-rent housing program.

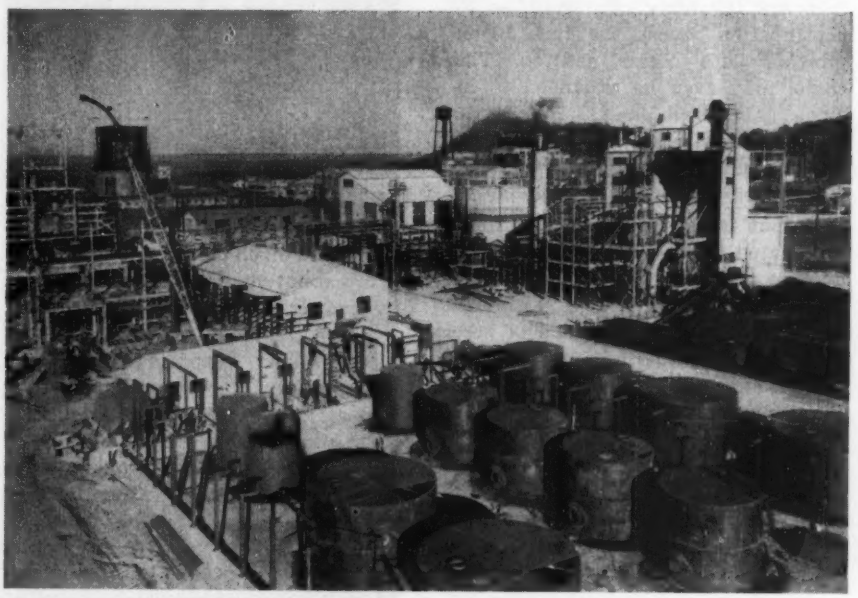
Darby: Metalworking Senator

Appointment of Harry Darby as United States senator from Kansas brings to three the number of metalworking men in the Senate.

Mr. Darby has operated a steel fabricating business in Kansas City, Kans. He learned his trade with Missouri Boiler Works Co., starting as a helper in 1911. He became a vice president in 1919. Since 1932 he has been president and owner of Darby Corp.

The other manufacturers in the Senate are Homer E. Capehart (Rep., Ind.) and Ralph E. Flanders (Rep., Vt.).

Important Outlet for Steel and Equipment A-borning



GAS SYNTHESIS DEMONSTRATION PLANT

. . . employing modified Fischer-Tropsch process for converting coal to oil

Steel requirements for converting coal into liquid fuel are as heavy as the requirements for producing liquid fuel from shale oil—5½ to 6½ tons per barrel of daily capacity (See STEEL Apr. 3, p. 73). For a plant such as this one at Louisiana, Mo., and capable of producing 30,000 barrels of liquid fuel daily, the requirements would be about 73,000 tons of plates, shapes and other steel products, 54,000 tons of pumps, heat exchangers, compressors and other fabrications, and 39,000 tons of pipe valves and fittings.

Many technical problems remain to be solved, but the Bureau of Mines estimates that high-octane gasoline even now can be produced from bituminous coal at 10.8 cents per gallon. For producing gasoline from shale oil, the cost is 7.3 cents per gallon.

Left to right, above the roadway and tracks in the picture, are the oxygen unit, coal gasification unit and the coal storage area. Below the roadway and tracks are the synthesis units and the product storage area.

Cartel Talk Mounts

Belgian producers put out feelers for "gentlemen's agreements" in plates and wire rods

BELGIAN steel groups have again contacted German steel firms, and steel people in other European countries, to form cartels in certain products.

A new cartel is planned by the plate producers of Belgium and Luxemburg for a kind of gentlemen's agreement on the plate price. They intend to stabilize the plate price at $64 to $66 per metric ton. Dutch producers will also be included. Similar discussions are being held to conclude an agreement on wire rods.

Guinea Pig—Watch the outcome of these plate and wire rod discussions for they are feelers that might mean a new postwar cartel structure in western Europe. If these "gentlemen's agreements" work out, others will follow in additional products.

The Belgians already have a sales cartel for steel sheets that was established Nov. 18, 1949. The members are favorably impressed, so its continuation beyond the June 30 expiration date seems assured. This cartel may even be expanded to include galvanized sheets. Before the war, black plate, sheets, black sheets and coated sheets were under a uniform sales allocation system.

Output Is the Spur—Cartel talk is stimulated by the threat of overproduction in steel this year. Economic Commission for Europe estimates that 68.2 million ingot tons of steel will be turned out in 1950 for all of Europe except Russia. That's 12.5 per cent more than the 60.6 million tons produced in 1949. (See STEEL, Apr. 3, p. 74).

Belgians have been having the most serious difficulties; hence, the lead they are taking in cartels.

Belgian Steel Output Slips

Belgian steel production thus far this year is limping behind the average 1949 pace of 351,000 tons monthly. Steel exports have improved a little, largely because of the increase in American prices and the suspicion that British quotations will soon rise.

Good demand is coming from Italy and the Near East. Argentina is also in the market.

Belgium's most active competitor for the European market is France. Their export prices are about the same—ranging, for example, from $52 to $54 per metric ton for concrete reinforcing rods and $54 to $56 for merchant bars. Delivery from Belgium varies from 5 to 8 weeks. Domestic demand for Belgian steel remains in the doldrums.

Prospects for steel consumers are a little better. Employment has slipped to 155,000 against the average 191,000 in 1948, but only 120,000 were on the metalworking industry payrolls in 1937.

New orders booked thus far this year show an increase over the showing of November and December, 1949.

Wide World

ROBOT VENDOR: Stealing the show at the exhibition of German inventions in Munich which closed late last month is this robot vendor. It was designed by Ludwig Hahnemann of Frankfurt. It is run by an electric battery. Ol' robot, selling magazines here, can be converted to other simple sales purposes. He costs 8000 deutschemarks—$2000 American money

Tito To Buy American Goods

Export-Import Bank has granted Yugoslavia a $20 million credit to buy American capital equipment, spare parts, machinery and materials. The credit will be available until Mar. 30, 1951.

Last September, the bank granted another $20 million credit to Tito. Of this total, $15 million was to enable Yugoslavia to purchase U. S. capital equipment and materials to rehabilitate nonferrous mines and related industries so as to permit the country, one of the leading producers of bauxite, mercury, copper, lead and zinc, to increase its exports to the United States.

The remaining $5 million went to acquire American industrial materials needed by other Yugoslav export industries.

Soviet Output Up

Russian iron and steel production in 1949 still only one-third of the U. S. level

RUSSIA'S postwar industrial production is gaining, but it's still far below that of the United States.

Soviet iron and steel production in 1949 was roughly one-third of America's. Russian pig iron output, at 18.7 million net tons (see the accompanying table), was 35 per cent of the 53.6 million tons of pig iron produced in this country in 1949. Russian steel ingot output, at 23.3 million tons, was 30 per cent of the 77.9 million tons of ingots produced here last year. Pig iron production in Russia last year was 14 per cent above the 1940 level; ingot output was 15 per cent higher. U. S. pig iron production rose 26 per cent in 1949, compared with 1940; ingot output rose 28 per cent.

Good Guesses — Although these Soviet production figures can be no more than estimates, the Department of Commerce, which compiled them, thinks they're fairly accurate. They are based on what little information the Reds themselves give out and on other data that leaks from behind the Iron Curtain.

The important developments in Soviet steel production are taking place in the Urals and Siberia. Ukranian plants were neglected for a time after the war, but now they are speedily being rebuilt. The large Korov steel plant in Makejewaka produced 1.4 million tons of pig iron, 418,000 tons of gray iron and 35,000 tons of high quality steel last year. Fear of the uranium and hydrogen bombs is speeding dispersal of all Soviet industries to the Urals, central Asia and Siberia.

Trouble in Coal—Despite the increase in coal output last year—nearly 260 million tons were produced—that fuel is a bottleneck in Soviet production plans. New deposits are being worked in the Workuta basin in the northern Urals, but heavy imports of coal from Poland and former German Silesia are necessary. The Communists have started a scheme of "socialist competition" to boost labor productivity.

For the second year in succession, U. S. trade with the Soviet Union in 1949 was marked by declining exports and imports. Value of all merchandise exported from the U. S. to the U. S. S. R. last year was $6,617,000, the lowest figure since 1923. We imported $39,140,000 worth of merchandise last year from Russia. Down to a trickle are our exports of machine

tools, electrical machinery and construction, mining, refining and conveying machinery that formerly comprised the bulk of Soviet procurement in the U. S. Our imports of manganese and chrome ores and nonmetallic minerals dropped.

No Blues for Reds

(Figures are in net tons unless indicated otherwise. All are estimated by Department of Commerce. Output for 1950 is planned production.)

	1940	1949	1950
Iron Ore	32,900,000	.....	44,000,000
Pig Iron	16,400,000	18,700,000	21,500,000
Ingot Steel	20,100,000	23,300,000	27,900,000
Copper	177,100	256,300	247,500
Primary Aluminum	65,890	.....	189,750
Manganese Ore	2,600,000	.....	4,070,000
Coal	182,600,000	259,490,000	275,000,000
Power Output (billions,kwhr)	48.2	73.2	82.0
Cars, Trucks (units)	147,000	304,000	500,000
Tractors(units)	31,100	79,000	112,000
Steam Locomotives (units)	917	1,023	2,200
Freight Cars (2-axle units)	47,000	100,180	146,000
Machine Tools* (units)	50,000	73,000	74,000

*Output of machine tool industry only; output of other ministries and of industrial co-operatives not included.

Red China Wants Ruhr Steel

Red China reportedly wants to buy 100,000 tons of rail steel from West Germany. Specific inquiries for 15,000 tons only have been made to Vereinigte Stahlwerke Ltd. and Kloeckerner Ltd. The order hasn't been signed and many legal questions may hamstring the contract.

Socialism Threat to U.S. Seen

The United States—ultimately—is more likely to go socialistic than England. So says Clayton Rand, newspaper columnist and author recently returned from England, who spoke before the annual spring conference of the Association of Iron & Steel Engineers Apr. 3-4 in Birmingham.

Mr. Rand says that without our financial support the Labor government in Britain already would have collapsed. He believes that the temptation to nationalize American steel is just as great as to take over British steel.

A. S. Glossbrenner, president of the association and assistant vice president of operations for Youngstown Sheet & Tube Co., points out that there is an increasing demand for steel from southern industry. Southern steel mills stand to benefit by the influx of Brazilian and Venezuelan ores.

About 700 attended the meeting that included inspection trips to Connors Steel Co. and Tennessee Coal, Iron & Railroad Co., Fairfield, Ala., works.

Castings Costs Cut

Bakelite Division of Union Carbide reveals plastic process under development by Boston firm

REDUCED cost and improved quality of production-run castings may be possible through a process under development by Crown Casting Associates, Boston.

Crown, which has applied for patents on various aspects of the process, credits Johannes Croning of Hamburg, Germany, with its development. Crown will license users.

The process was described by the Office of Technical Services, Washington, two years ago.

Bakelite Division of Union Carbide & Carbon Corp., New York, is enthusiastic over the process as a new application for a Bakelite resin in cores and molds, says Gordon Brown, Bakelite vice president.

New Departure—While resins have long been used as a bond for core sand, Mr. Brown states, present method is a radical departure since Bakelite resin-treated sand does not require long baking and curing and substantially reduces the amount of sand required.

High precision is the outstanding advantage claimed for castings produced by the process. Clean sharp edges, true dimensions and unchilled surfaces that require little or no finishing are possible. Tolerances of from 0.002 to 0.003 inch per inch can be common practice. Where extremely close tolerances are required, only a finish cut may be necessary instead of rough and finish cuts.

More Space—The process also will enable the user to save space because up to 90 per cent less sand is consumed with this method than with normal techniques. Sand preparation and handling will be proportionately reduced with a resulting cut in labor and improved cleanliness.

Procedure for production of molds by the process is: 1. A metal pattern, forming half of the mold, is heated in an oven; 2. thoroughly blended sand and pulverized Bakelite resin are applied to the hot pattern, causing the resin to melt and form a continuous coating over the pattern surface; excess sand is then poured away; 3. the pattern with the adhering sand and Bakelite resin is hardened in an oven for one to two minutes; 4. the mold and pattern are then separated.

Thin Mold—To prepare the molds for casting, both halves are held upright and tight together by a surrounding bed of steel shot or similar material.

The steel bed supports the thin mold shells against the hydrostatic pressure of the molten metal. Gases generated during the pouring process are said to pass readily through the mold and little resistance is offered to the casting as it solidifies and contracts, minimizing formation of cracks and hot tears.

INTERNATIONAL TEAMWORK: That's what helps direct American-designed equipment to dollar-short areas of the world. W. Gilchrist (left), Cooper-Bessemer foundry superintendent, talks over molding practices with Jack Martin, assistant foundryman of Harland & Wolff Ltd., British ship and engine builder. The two companies completed a licensing agreement whereby Harland & Wolff will build Cooper-Bessemer heavy engine-driven equipment in Britain for sale to countries in the sterling area

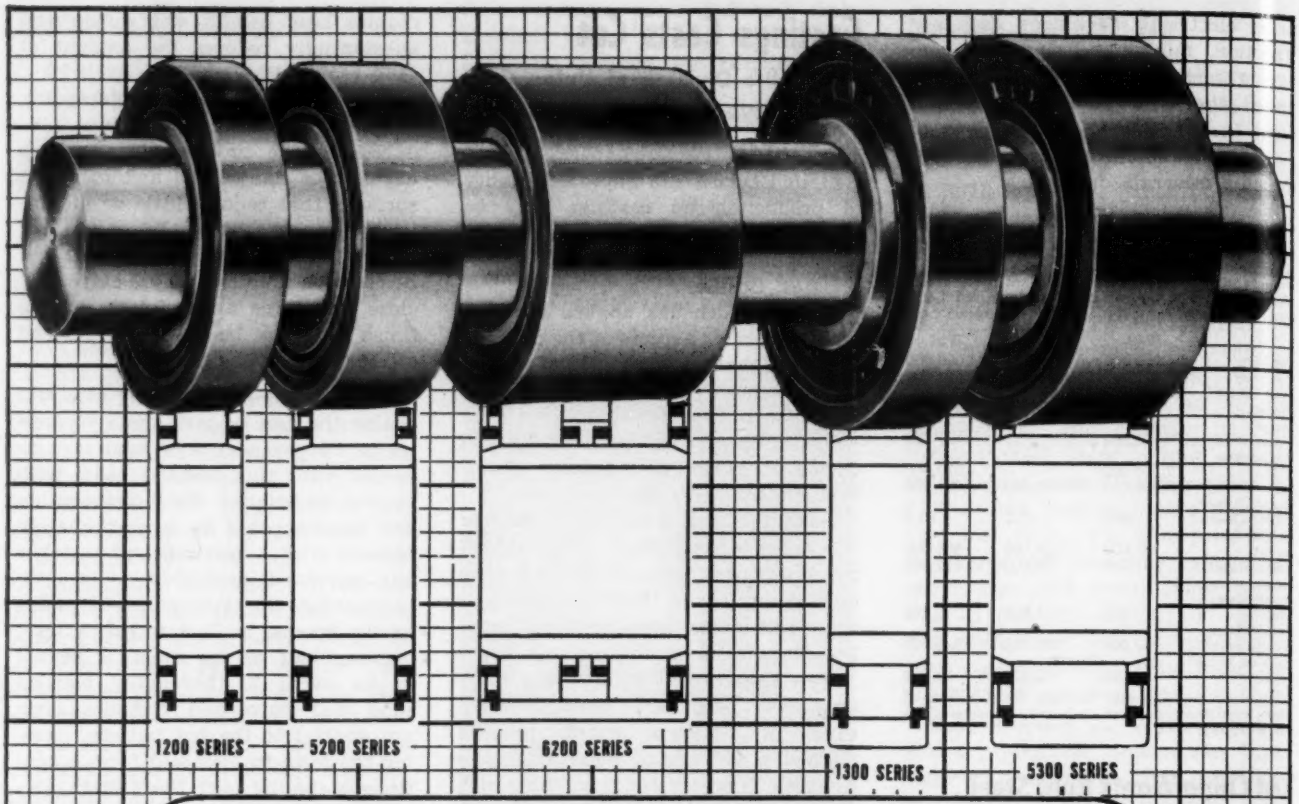
United Pours Giant Casting

United Engineering & Foundry Co., Pittsburgh, poured a 485,000-pound finished machinery casting at its New Castle, Pa., plant that will be 27 feet long, 9 feet high and 13 feet wide.

Company says it will be the largest such casting on record. The casting will be used as a frame for a high speed 7200-ton mechanical forging press.

Initial pouring operation involved close to 600,000 pounds of steel, followed by four more aggregating 100,000 pounds of metal.

The steel will cool for 6 to 8 weeks before the casting is lifted from the sand.



5 TYPES—1 SHAFT SIZE

"It's easier with HYATTS"

As a designer, your job is made easier when you have a large selection of bearing types from which to choose. Here are five Hyatt Hy-Load Bearings . . . all different in size and load carrying capacity . . . yet all fitting a common shaft.

If the loads are light you may economize in space, cost and weight by using the narrow width bearings of our medium (1200) series.

Should the loads be heavy and the permissible outside diameter limited you can choose from the wide or duplex width (5200-6200) bearings of this same medium series.

When you have a condition where the loads are heavy and the axial space is not available, increased capacity can be provided by increasing the annulus size and using the 1300 or 5300 series bearings.

These five combinations, available in most standard bearing bore sizes, illustrate just one of the many types and sizes of Hyatt Roller Bearings as shown in our new Hy-Load bearing catalog. Want a copy? Hyatt Bearings Division, General Motors Corporation, Harrison, N. J., Chicago, Detroit, Pittsburgh and Oakland, Calif.

HYATT ROLLER BEARINGS

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Auto industry of the U. S. and Canada assembles a record 1.7 million cars and trucks in the first quarter despite the Chrysler strike. GM turns out more than half

DETROIT

CONCLUSION of a record-breaking first quarter found the automotive industry planning still further increases in schedules, with the likelihood of Chrysler plants returning to operation momentarily.

Even without Chrysler, the industry rolled some 1.7 million cars and trucks from U. S. and Canadian plants, General Motors divisions alone accounting for 870,967. GM broke all records in March, pushing output up to 327,568 or 60,000 better than in February. And April likely will top this figure as double shifts have been initiated in some Chevrolet and Buick plants for the first time in history.

Stitch in Time—Some observers believe GM is putting on extra steam at this time in the hope of building up dealers' stocks to the point where they would be comfortably fixed should a strike be called at the end of May. However, the more the pace of assembly lines is stepped up the faster dealers seem to move the cars.

For example, Olds dealers sold 11,015 new cars in the second ten days of March, or 71 per cent more than during the same period a year ago. During the first 20 days of the month, deliveries of 22,637 new cars were more than for the entire month in 1949. From Jan. 1 through Mar. 20 sales were 61 per cent ahead of a year ago.

Same Story—At Buick the picture is similar. March production of 48,616 was 55 per cent over a year ago and raised assemblies for the first quarter to 122,864, the greatest three-month performance in the history of the division. Facilities for production of Dynaflow transmissions have been increased for the third or fourth time, both feeder and assembly lines being lengthened and two new final test machines added, along with the revamping of other machinery. As a result, output of the transmission units has jumped to 1350 daily and for the first quarter totaled 90,341. This means that automatic transmission production now is up to about 78 per cent of car assemblies.

Three times during March Chevrolet set new daily production records. On Tuesday, Mar. 28, the old record was broken when 7909 cars and trucks were built. Then on Thursday the total climbed to 8045 and on Friday continued at the high level of 7931. Final tally for the month showed 128,848 pasenger cars and 43,266 trucks.

Cadillac also toppled old records by turning out 9125 cars in March, the previous high being 8247, set last August. Pontiac kept pace, with 39,060 cars and 210 commercial units, comparing with 26,656 in March a year ago. For the quarter, Pontiac built 107,891 vehicles, or almost 80 per cent more than in the same interval last year.

Ford Moving Up—Ford has been keeping step in its car and truck lines, and is narrowing the gap in the race with Chevrolet although it still has some distance to go to match the stride of the No. 1 producer. The first quarter saw something over 459,000 units built by Ford, Lincoln and Mercury and schedules for the next three months are being inched up further so that the first half of the year will bring close to a million. Supply shortages are keeping the goal of 5000 passenger cars daily a little beyond reach.

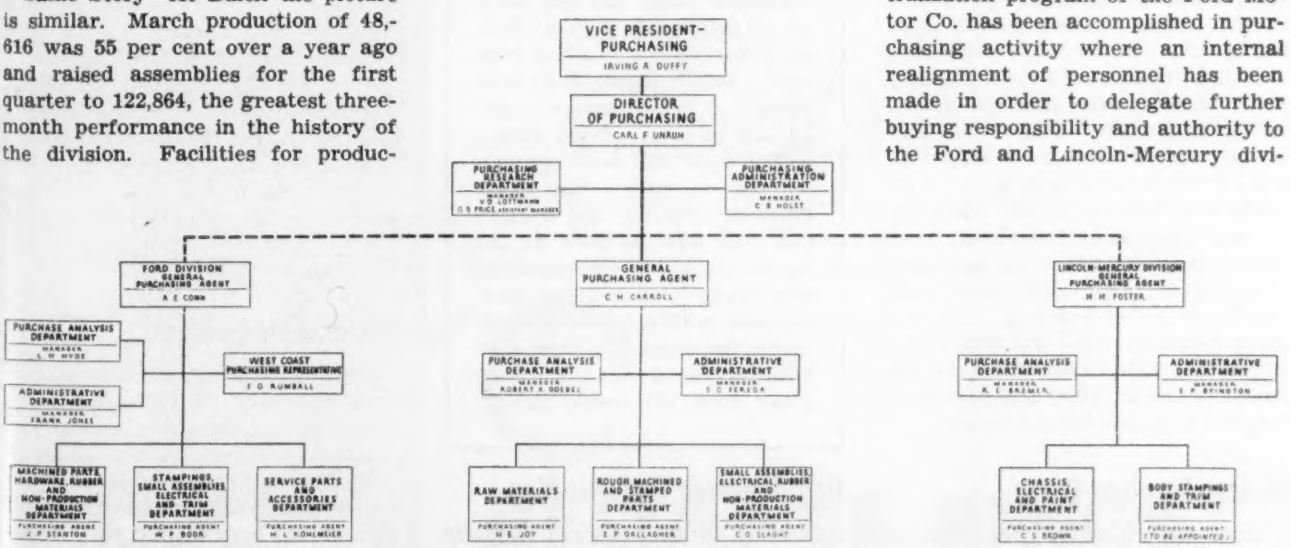
Lost: 339,000 Chrysler Units — Chrysler's production loss now has mounted to the equivalent of 339,000 cars and trucks and there appeared slim chance of any return to work developing until after the Easter holiday. As one production official put it, "Why try to start before then, when half the force would take Easter Monday off anyway."

Joining in the campaign of newspaper advertisements seeking to get Chrysler plants back in the production picture last week were "suppliers to the automotive industry." Pointing to the "terrific toll in hunger, heartaches and money" which the strike has exacted, the unnamed suppliers observed, among other things, that "it seems uneconomic and unfair to ask every employer to subscribe to a fixed pattern of 'cents-per-hour,' perhaps set by competitors if an employer, due to a different set of factors, is able to offer the same security at lower costs." In this position they have much support throughout all industry.

Ford Decentralizing

A further step in the basic decentralization program of the Ford Motor Co. has been accomplished in purchasing activity where an internal realignment of personnel has been made in order to delegate further buying responsibility and authority to the Ford and Lincoln-Mercury divi-

Ford Purchasing Setup



—— Indicates Functional Supervision

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sions and to consolidate the central office buying staff procuring for the manufacturing divisions. Carl F. Unruh, who joined Ford in 1916 as a toolmaker, is named director of purchasing on the staff of the vice president-purchasing, Irving A. Duffy. During the first World War, Unruh was in charge of a tank building program, then became general foreman of production of rear axle housings and crankcases for the Model T. He built the first Ford storage battery in 1922 and transferred to purchasing in 1925.

Charles H. Carroll, a veteran in the purchasing department since 1918, has been appointed purchasing agent of central office purchasing, while the buying activity at the Ford and Lincoln-Mercury divisions will continue to be headed by Albert E. Conn and Herbert H. Foster, respectively. In order to give end-product divisions control of their costs of parts purchased, either from outside suppliers or company manufacturing units, those items purchased for delivery to assembly units will be the responsibility of the division concerned, while those items generally having common usage throughout the company will continue to be bought by the central purchasing office.

Mr. Carroll, who in the early days was associated with the Henry Ford & Son tractor building division, during the last war supervised the purchasing of parts and raw materials for aircraft engine manufacture, and until his most recent appointment has been purchasing agent for body stampings, electrical and rubber parts.

Willys Cuts Prices

The 2000 Willys-Overland dealers and distributors who drove away 1800 of the company's new models from the Mar. 30 "dealer day" ceremonies in Toledo, O., received the added impetus of substantial price reductions in the line. They range from $120 on the 6-cylinder station wagon to $40 on the Jeepster, and apply to all models except a sedan delivery, civilian jeep and four-wheel drive station wagon. A new ½-ton truck is priced at $1220, right down with the lowest in the industry. The last price reduction made by Willys was in March, 1949, when tags on the complete line of utility and passenger vehicles were revised downward.

Hudson Earnings Down

Hudson's net income, equivalent to $5.30 per share for 1949, was down from the $7.28 per share earned in 1948. Sales volume was down from $275 million to about $260 million, caused in the main by reduced volume of replacement parts and accessories business. A further factor bearing on the earnings picture last year was steel procurement and the attendant high cost of material purchased on special arrangements, now discontinued. Hudson's working capital at yearend was up $6.3 million, and inventories were reduced substantially during the year.

Auto, Truck Output

U. S. and Canada

	1950	1949
January	610,211	445,092
February	504,954	443,734
March	613,000*	543,711
April		569,728
May		508,101
June		623,689
July		604,351
August		678,092
September		657,073
October		601,021
November		474,731
December		384,318
Total		6,533,641

Weekly Estimates

Week Ended	1950	1949
March 18	134,453	120,741
March 25	140,196	121,341
April 1	139,260	119,088
April 8	143,000	131,870

Estimates by Ward's Automotive Reports
* Preliminary.

Saves Money

City drivers can save up to 60 per cent on their gasoline bills, says W. B. Rice of the Plymouth Motor Division service department in a new booklet giving results of actual road tests. How? Drive at 50 mph instead of 70 and save one gallon out of four. Avoid unnecessary stops and save one gallon out of three. Use lower gears for starting and shift to the next gear as soon as the engine will take it smoothly. Says Rice: "Jet-propelled takeoffs may be fun, but they're not worth the extra gas they cost. What if you do beat Joe Blow away from the traffic light?"

Help Wanted: Tool, Die Men

The call is out in Detroit for body die designers, Keller machine operators, tool designers and detailers, suggesting an accelerated tempo in 1951 model die works. In particular the tool and die division of Fisher Body has been advertising regularly for skilled help in these classifications, while a number of the smaller independent die shops also have been seeking to enroll larger working forces. It appears that despite the long tieup in Chrysler operations there is no surplus of experienced personnel in the tool and die field.

"Potatoes and Gravy" Approach

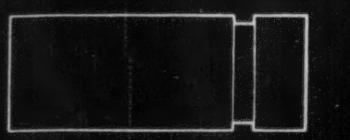
John S. Bugas, vice president-industrial relations for Ford, recently explained to a group of western petroleum refiners what he calls the "mashed potatoes and gravy" approach to collective bargaining. He said that the recent wage gain of coal miners reminds us that labor union leaders are under constant political pressure, and when one large industry receives benefits of wage raises in excess of another, the latter feels it politically necessary to close the gap or even outdo the former.

The "potatoes and gravy" never come out even, and the plate is always being passed to management for a refill of one or the other. Little thought is given to the possibility that the supply in the kitchen may run out. Bugas pointed out that Ford is constantly trying to improve the avenues of communication between management and the working force. One of the latest ideas is the tape recording of management meetings in Dearborn of top officials in the various company divisions and the shipment of these recordings to all plants and offices for supervisory employees to hear. Another experiment was the invitation of wives of employees in many separate plants to visit their husbands at work and to inspect the various devices provided by the company for the protection of employees at work.

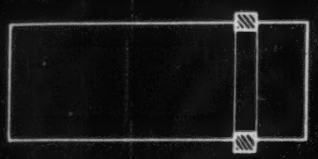
Ford also has its nationwide plants now hooked up on a teletype system, over which are regularly dispatched such things as production and sales reports, summaries of speeches, statements by officials, reviews of labor negotiations, advance news announcements and the like.

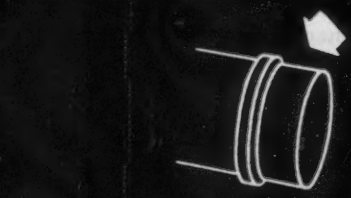
Packard Modernizes

Complete modernization of the electrical system of the Packard plant is to be finished shortly at a total cost of about $100,000. A new phase in the company's safety program, representing an additional investment of $49,000, has been started with installation of safety devices on 61 presses in the stamping division.

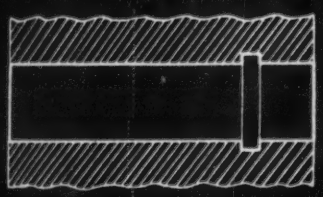


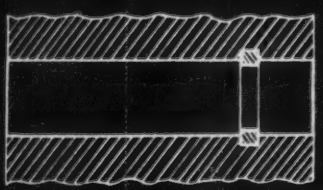
ON SHAFTS





IN COUNTERBORES





EATON

ATON MANUFACTURING COMPANY

STRONG SHOULDERS

in Seconds

Why buy steel to shoulder diameter and spend costly labor and time machining a shoulder . . .
when you can start with steel of the shaft diameter, machine a groove a few thousandths deep and slip a Reliance Ring into it?

Why drill to shoulder diameter and machine to bore diameter for a shoulder in a bore . . .
when you can just drill to bore diameter (or use tubing), machine a shallow groove and slip a Reliance Ring into it?

You can cut minutes to seconds and save labor and material cost.

Reliance Snap Rings are carefully heat treated and properly tempered to specifications. They are strong and are designed to withstand determined thrust loads.

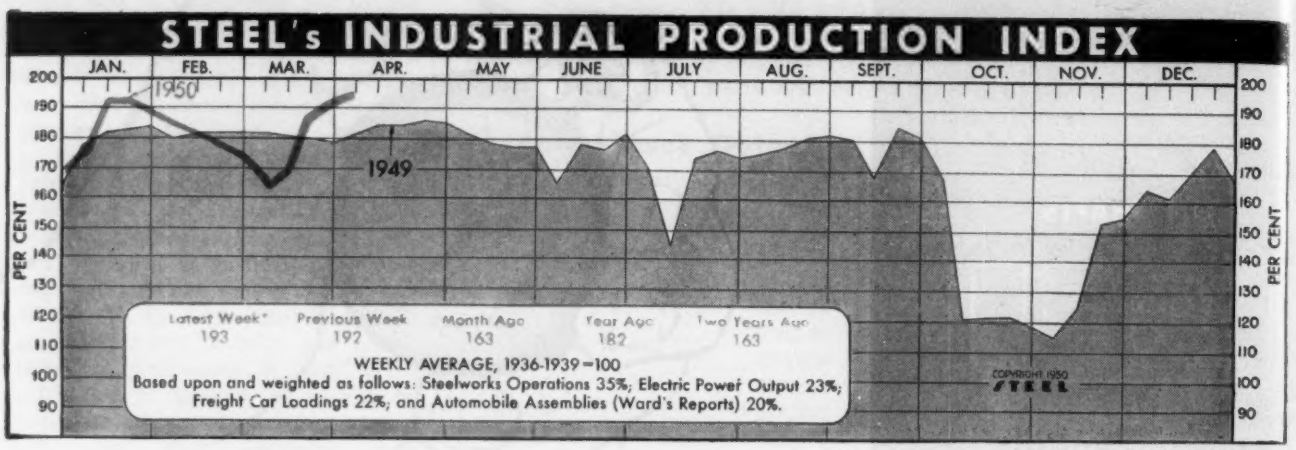
Reliance Ring Engineers are at your service. Just write, phone or wire and they'll show you how Reliance Rings can cut the cost of your shouldered parts.

C

RELIANCE RINGS

RELIANCE DIVISION, MASSILLON, OHIO

Sales Offices: New York, Cleveland, Detroit, Chicago, St. Louis, San Francisco, Montreal


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1950
1949
PER CENT
Latest Week* 193
Previous Week 192
Month Ago 163
Year Ago 182
Two Years Ago 163
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
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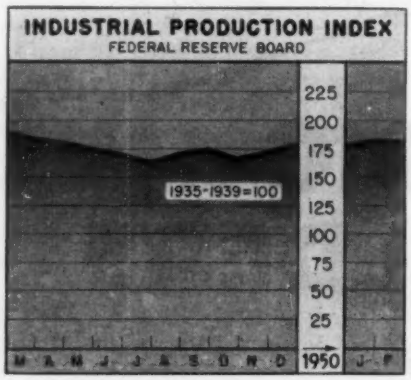
*Week ended Apr. 1 (preliminary)

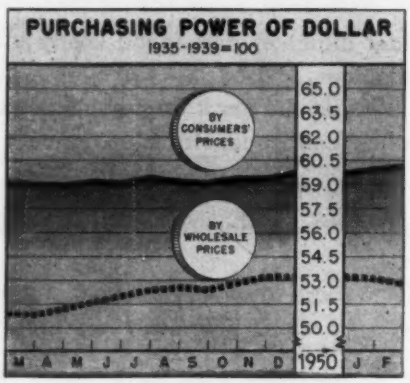


Charts—Copyright 1950, STEEL

Industrial Production Indexes

	Total Production		Iron, Steel		Non-ferrous	
	1950	1949	1950	1949	1950	1949
Jan.	183	191	203	228	179	184
Feb.	180	189	201	232	182	185
Mar.	...	184	...	233	...	183
Apr.	...	179	...	219	...	168
May	...	174	...	204	...	145
June	...	169	...	177	...	132
July	...	162	...	156	...	128
Aug.	...	170	...	178	...	141
Sept.	...	174	...	179	...	157
Oct.	...	166	...	103	...	164
Nov.	...	173	...	144	...	163
Dec.	...	180	...	198	...	165
Avg.	...	176	...	187	...	160

Federal Reserve Board

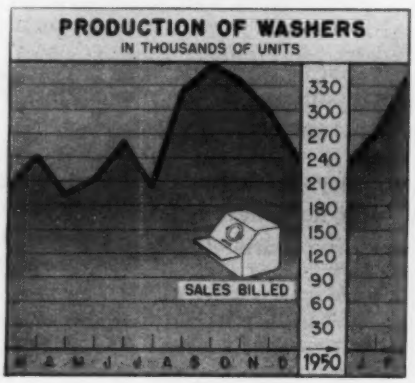


Purchasing Power of the Dollar

As Measured By:

	Wholesale Prices		Consumers' Prices	
	1950	1949	1950	1949
Jan.	53.1	50.1	59.9	58.5
Feb.	52.8	50.9	60.1	59.2
Mar.	...	50.8	...	59.0
Apr.	...	51.2	...	58.9
May	...	51.6	...	59.1
June	...	52.0	...	59.0
July	...	52.4	...	59.3
Aug.	...	52.6	...	59.2
Sept.	...	52.4	...	59.0
Oct.	...	52.8	...	59.3
Nov.	...	53.2	...	59.3
Dec.	...	53.2	...	59.7

U. S. Office of Business Economics



Household Washers

Sales Billed—Units

	1950	1949	1948
Jan.	275,576	172,400	360,445
Feb.	342,967	201,300	367,909
Mar.	.....	242,500	408,512
Apr.	.....	192,500	402,257
May	.....	211,700	377,895
June	.....	260,700	392,496
July	.....	200,900	326,181
Aug.	.....	323,789	362,169
Sept.	.....	357,281	433,919
Oct.	.....	333,728	382,400
Nov.	.....	298,717	319,300
Dec.	.....	237,591	183,700
Totals	.....	3,033,106	4,317,183

American Washer & Ironer Mfrs. Assoc.

Issue Dates of Other FACTS and FIGURES Published by STEEL:

Constr. Valuation..Mar.20
Durable Goods Mar.27
Employ., Metalwkg .Mar.20
Employ., Steel Apr.3
Forgings, Steel.....Apr.3
Foundry Equip. ...Mar.13
Freight Cars Mar.20
Furnaces, Indus. ...Jan.2
Furnaces, W. Air...Jan.2
Gear Sales Apr.3
Ironers, Standard ..Mar.20
Machine Tools Mar.27
Malleable Cast. Mar.27
Price Indexes Apr.3
Pumps, Orders Apr.3
Ranges, Electric ..Mar.27
Radio, Television ..Mar.27
Ranges, Gas Jan.2
Refrigerators, Elec..Mar.27
Steel Castings Feb.27
Trucks, Elec. Ind...Jan.2
Vacuum Cleaners...Apr.3
Wages, Metalwkg. .Mar.20

FRB Index Climbing

Industrial production is climbing back to levels reached in early 1949. March's index should be slightly higher than the 183 attained in January, says the Federal Reserve Board and further gains are expected in April.

In February the board's seasonally adjusted index declined 3 points to 180 per cent of the 1935-1939 average. Strikes in coal and automobiles, only partly offset by rising output in machinery and building materials, were chief contributors to the decline.

Machinery production increased 4 per cent in February to the highest point since April, 1949, FRB reports. While much of this rise reflected continued marked gains in refrigerators, television and other consumer goods, advances were general in producers equipment. In some lines, such as agricultural machinery, increases were largely of a seasonal nature.

The exceptionally high level of construction activity was an important factor in stimulating output in some machinery industries during February. Building materials and furniture also profited from the building surge.

Washer Demand High

Standard-size household washer sales continued to climb in February. Factory sales that month were higher, with one exception, than in any month since October, 1948. February's total was 342,967 units, an increase of more than 24 per cent over January's 275,576 and about 70 per cent higher than the 201,300 units sold in February, 1949.

In the last 16 months only September, 1949, sales which reached 357,281 topped the February aggregate. Factory sales in September and October normally reach a high point in preparation for Christmas buying.

Dryer sales totaled 19,389 in February, compared with 19,495 in January and were up 106 per cent over February, 1949.

The Business Trend

Weekly output in metalworking setting new records even with one of auto industry's Big Three strikebound. New highs should be reached in second quarter

WHAT is the ceiling for metalworking output? It certainly has not been reached yet even though STEEL's industrial production index reached an alltime weekly high in the week ended Apr. 1 when it rose to 193 per cent (preliminary) of the 1936-1939 average. This mark was attained with Chrysler plants strikebound.

Critics of American business and pessimistic businessmen believed that output marks attained in the last quarter 1948 and in early 1949 would never again be challenged. Fortunately many metalworking executives went right on and expanded their facilities so that production currently is again at lofty heights in metalworking and almost as good in other lines.

Steelmaking...

Many steel industry executives now believe the second half will be better than was expected at the start of 1950. While few people expect the present high steelmaking rate to continue all year, forecasts are being revised to include a good third quarter and a satisfactory fourth. There's a good chance 1949's total of 77,868,353 tons of steel for ingots and castings will be exceeded this year. In the week ended Apr. 1, steelmaking operations were at 97 per cent of capacity. Current operations are holding at about the same level and there is no indication that they will drop in the weeks immediately ahead.

Automobiles...

How many cars would the auto industry be producing a week if Chrysler assembly lines were rolling? Answer: 185,000 passenger cars and trucks, about 25,000 more than in the best weekly total to date set last July. This total is based on last week's scheduled outturn of 143,000 units plus the 42,000 cars and trucks Chrysler plans to add weekly when its strike is settled. Overtime is scheduled by many auto builders and "glowing" sales prospects are reported.

Carloadings...

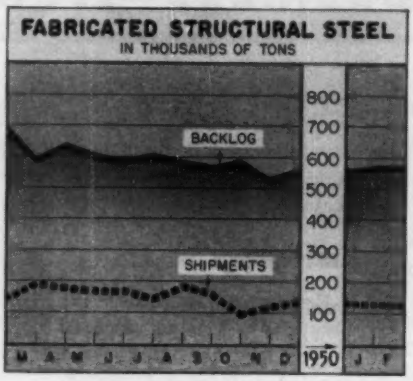
Estimates by the 13 Regional Shippers Advisory Boards indicate that freight carloadings in the second quarter will be 1.4 per cent higher than in the same period in 1949. The boards submit these estimates to the Association of American Railroads at the start of each quarter as an aid to railroad planning. Seven of the boards expect increased loadings in their regions and six estimate loadings will decline. Largest percentage increase is forecast in New England region and the largest drop in the Central Western district.

Construction...

Construction put in place during the first quarter totaled $4.4 million, a new record for the period and 18 per cent above the like 1949 quarter. Commerce and Labor Departments report that private construction was up 17 per cent and public

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	97.0	96.0	69.0	100.0
	Electric Power Distributed (million kilowatt hours)	5,912	5,993	5,879	5,378
	Bituminous Coal Production (daily av.—1000 tons)	2,060	2,217	437	405
	Petroleum Production (daily av.—1000 bbl.)	4,873	4,848	4,909	5,130
	Construction Volume (ENR—Unit $1,000,000)	$263.9	$177.3	$133.4	$132.2
	Automobile and Truck Output (Ward's—number units)	139,260	140,196	124,072	119,088
	*Dates on request. †1950 weekly capacity is 1,906,267 net tons. 1949 weekly capacity was 1,843,516 net tons.				
TRADE	Freight Car Loadings (Unit—1000 cars)	720†	717	574	726
	Business Failures (Dun & Bradstreet, number)	198	186	179	216
	Money in Circulation (in millions of dollars)‡	$26,969	$26,972	$27,060	$27,403
	Department Store Sales (changes from like wk. a yr. ago)‡	none	+1%	−5%	−16%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$13,254	$15,827	$14,484	$12,592
	Federal Gross Debt (billions)	$255.7	$255.9	$256.2	$251.7
	Bond Volume, NYSE (millions)	$21.5	$22.8	$19.3	$16.6
	Stocks Sales, NYSE (thousands of shares)	10,746	9,306	7,932	6,538
	Loans and Investments (billions)†	$67.0	$66.9	$67.0	$61.7
	United States Gov't. Obligations Held (millions)†	$36,702	$36,877	$37,162	$32,680
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Weighted Finished Steel Price Index††	156.13	156.13	156.13	154.01
	STEEL's Nonferrous Metal Composite‡	157.4	157.4	159.8	216.9
	All Commodities†	152.1	151.7	152.6	158.1
	Metals and Metal Products†	169.6	169.6	169.2	173.8
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.				

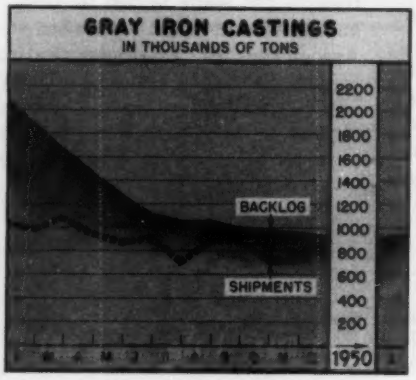


Fabricated Structural Steel

Thousands of Net Tons

	Shipments		Backlog	
	1950	1949	1950	1949
Jan.	133.4	152.7	565	675
Feb.	122.6	145.9	565	683
Mar.	....	185.9	...	582
Apr.	....	179.2	...	628
May	....	171.1	...	599
June	....	172.3	...	583
July	....	148.0	...	605
Aug.	....	183.9	...	583
Sept.	....	162.1	...	562
Oct.	....	99.8	...	584
Nov.	....	117.2	...	527
Dec.	....	135.5	...	555
Total	....	1,853.5	...	...

American Institute of Steel Construction

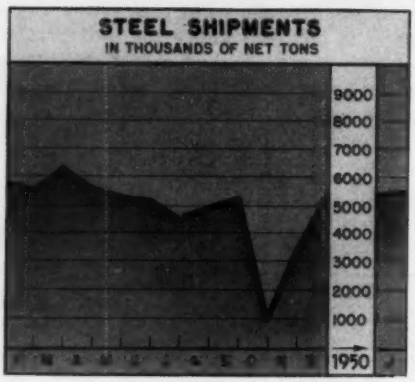


Gray Iron Castings

Thousands of Net Tons

	Shipments		Backlogs*	
	1950	1949	1950	1949
Jan.	913	1,040	914	2,065
Feb.	...	987	...	1,857
Mar.	...	1,075	...	1,639
Apr.	...	929	...	1,446
May	...	867	...	1,243
June	...	906	...	1,087
July	...	697	...	1,032
Aug.	...	872	...	1,048
Sept.	...	881	...	980
Oct.	...	716	...	955
Nov.	...	719	...	939
Dec.	...	862	...	892
Total	...	10,551		

* For Sale. Bureau of the Census



Steel Shipments

Net Tons

	1950	1949	1948
Jan.	5,482,691	5,788,632	5,410,438
Feb.	.....	5,519,938	5,046,115
Mar.	.....	6,305,681	5,978,551
Apr.	.....	5,596,786	5,096,161
May	.....	5,234,862	5,321,375
June	.....	5,177,259	5,476,774
July	.....	4,534,855	5,229,880
Aug.	.....	4,918,314	5,329,060
Sept.	.....	5,236,196	5,511,474
Oct.	.....	935,037	5,952,008
Nov.	.....	3,296,809	5,732,256
Dec.	.....	5,410,902	6,056,282

American Iron & Steel Institute

Charts—Copyright 1950, STEEL

construction was up 21 per cent. Nonfarm home building accounted for 44 per cent of the quarter's total against 35 per cent in 1949. Privately financed new construction work in March was valued at $1125 million, 5 per cent above February and up 18 per cent over the March, 1949, total. Public expenditures added $375 million.

Business...

New business incorporations dropped less than seasonally in February. Total for the month was 7736, a decrease of 14.7 per cent below January but a gain of 21.6 per cent over February last year. Aggregate for the first two months is 16,806 incorporations, an increase of 17.8 per cent over the 14,268 charterings in the corresponding 1949 period.

Utilities...

Electric utilities' net income and gross revenue for the first three months set new highs for a first quarter. Preliminary estimates indicate the industry's first quarter net income rose 9 per cent above the like 1949 period to $230 million and gross revenues climbed 6 per cent to $1125 million. Net income earnings available to stockholders did not increase because amount of common stock outstanding also increased 9 per cent.

Production Expands

Commerce Secretary Sawyer says uptrend is unmistakable but problems still remain

TOTAL production value—covering not only the industrial sector but also distribution, agriculture, services and government—again is moving upward, says Commerce Secretary Charles Sawyer. The rise in our gross national product was small in the first quarter, he explains, and cannot yet be measured with precision, but the fact of expansion is unmistakable.

Disappearance of inventory accumulation and the appearance of actual liquidation accounts for virtually the entire decline in the gross national product in 1949. Even in this period consumer purchasing was stable, except in the first quarter 1949 when the small decline was about in line with a drop in consumers' prices.

Manufacturing Up — Principal impact of the adjustment was in manufacturing, and it is also in this area that the current improvement is most marked. Present position of the economy may be summarized by noting that in the first quarter the total dollar value of production was 4 to 5 per cent below the peak reached in the fourth quarter of 1948. Since the consumers' price index fell 3 per cent over this period the reduction in physical volume is slight.

Consumer spending in the first quarter 1950 was at the same dollar level as in the earlier peak quarter and above the like 1949 period. In physical volume it was an alltime high.

Plant Investment Down—Declining trend of investment in productive facilities from the high postwar rates and the increase in unemployment despite high volume of business are unfavorable trends. The first factor is the natural result of completed postwar expansion programs and the second is caused by a growing labor force and rising labor productivity. It still remains to be seen whether current favorable business developments will result in better than seasonal employment increases and decreases in unemployment.

TV Aids Steel Sales

Television's rapid growth has generated a large new market for certain special steels, says Republic Steel Corp. The average television set takes about ten times the poundage of silicon steel used in a radio set. In addition, most larger-size television tubes have stainless steel bodies. An esti-

mated 10,000 tons of stainless steel will go into tube bodies in 1950.

Truscon Steel Co., a Republic subsidiary, is also benefiting from the rapidly expanding television market. New towers are needed for each broadcasting station and in some areas a long chain of relay towers is erected to cover regions not reached by coaxial cable.

Unemployment Drops 561,000

Employment rose 598,000 in March and unemployment dropped 561,000. The Census Bureau says the number of persons at work climbed to 57,551,000 while unemployment receded to 4,123,000. February's unemployment total was at the highest level in eight years.

New additions to the labor force represent the difference between the employment gain and the unemployment decline, the bureau says. It is still too early to determine whether the March figures reflect much more than the normal pickup of seasonal industries and the settlement of the coal strike.

Normal Buying Patterns Return

Farm equipment buying contracted sharply this winter as farmers resumed buying on a seasonal basis. Despite this fact, most farm equipment builders feel this year will show only a moderate decline from 1949's alltime high.

Among five leading farm equipment producers Deere & Co. sales showed the smallest decline, down 2.9 per cent from the total for the first quarter 1949. Other declines reported were: International Harvester, 19 per cent; Oliver Corp., 28.4 per cent; Minneapolis-Moline Co., 48.6 per cent; J. I. Case Co., 62.3 per cent.

A marked pickup in demand in February and March indicates the first quarter demand was probably a return to normal buying patterns. In normal times farmers did not buy machinery until they needed it in the spring. During the war and until a year ago they bought the year around whenever machinery was available.

Better Than a Year Ago

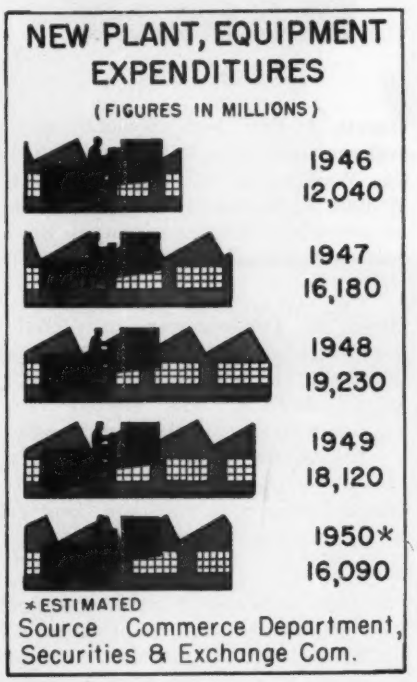
Outlook for 1950, barring prolonged strikes is encouraging for Signode Steel Strapping Co., Chicago, says John W. Leslie, chairman of the board. Orders received, shipments and earnings are running well ahead of 1949's like period.

He believes swings in business activity will be less in evidence and business will follow more seasonal trends. Two new plants will bring the company large freight savings and operating economies.

Lower Expansion Rate

Outlays for plant and equipment this year predicted to be 11 per cent below 1949 total

CAPITAL outlays for plant and equipment by American business will be 11 per cent lower in 1950 than they were in 1949. A joint survey conducted by the Commerce Department and the Securities & Exchange Commission shows American business, exclusive of agriculture, is expected to make outlays of $16.1 billion this year, compared with $18.1 billion in 1949 and $19.2 billion in the peak year 1948.



Expenditures in the first half of this year are expected to fall about 8 per cent below the first half of 1949.

Slower Second Half — A further slowing is forecast for the second half with anticipated outlays down about 14 per cent below the corresponding period last year. The second half decline may actually be smaller than indicated since there is some tendency for companies to underestimate their plant and equipment expenditures over the long term.

Plant construction in 1949 made up about 30 per cent of total expenditures for plant and equipment and little change in the proportion is expected this year.

Smallest Since 1946 — The outlay for 1949 is smallest since 1946 and declines are expected from 1949 levels in all categories shown in the accompanying table. First quarter 1950 expenditures are now estimated to be 7.5 per cent higher than the amount predicted for the period in a forecast made at the end of 1949. The increased outlay for the first quarter may indicate an increased confidence in the business situation. Should this condition continue throughout the rest of the year, the 1950 total may climb but will still be below 1949.

Largest decline in 1950 expenditures is anticipated by railroad and other transportation companies. They expect to spend 32 per cent less than last year. Electric and gas and manufacturing companies plan capital outlays only 6 and 7 per cent, respectively, below 1949.

Actual expenditures of $18.1 billion for 1949 were very near the $18.3 billion estimated in the two governmental agencies' survey early in that year. Actual outlays in the fourth quarter of 1949 and those now estimated for the first 1950 quarter were higher than originally anticipated.

$10 Million Building Program

Fairbanks, Morse & Co., Chicago, will spend $10 million this year to expand and improve its facilities. This is the biggest outlay the company has ever made in a single year for capital assets. Some idea of the program's size may be gained from the fact that the firm's net investment in property, plants and equipment totals only $16.7 million.

Fairbanks Morse sales thus far in 1950 are 20 per cent higher than in the corresponding period last year, says Robert H. Morse Jr., president.

Construction of a $5 million plant in Kansas City, Mo., is the biggest item in the building program. Another large project is a $2.5 million boiler house for Fairbanks Morse's Beloit, Wis., plant.

U.S. Business' New Plant, Equipment Expenditures

(Millions of dollars)

	1945	1946	1947	1948	1949	1950*	1949 Oct.-Dec.*	—1950— Jan.-Mar.*	Apr.-June*
Manufacturing	3,210	5,910	7,460	8,340	7,250	6,740	1,830	1,700	1,740
Mining	440	560	690	800	740	650	180	170	170
Railroad	550	570	910	1,320	1,350	930	300	250	260
Other Transportation	320	660	800	700	520	350	120	80	90
Utilities	630	1,040	1,900	2,680	3,140	2,940	890	740	810
Commercial and misc.	1,480	3,300	4,430	5,390	5,120	4,480	1,320	1,170	1,180
Total	6,630	12,040	16,180	19,230	18,120	16,090	4,630	4,110	4,250

* Estimated. Note figures are rounded and will not necessarily add to totals. Source: Commerce Department, SEC.

Men of Industry

MILTON K. GREY

Milton K. Grey, former vice president in charge of sales, Hill-Shaw Co., Chicago, has joined **Benchmaster Mfg. Co.,** Los Angeles, as director of sales and advertising. Before joining Hill-Shaw, Mr. Grey operated his own offices as a sales and marketing consultant, and served as general sales manager, Midway Chemical Co., Chicago.

—o—

C. L. Sapp, former secretary, was elected president of **Farquhar Furnace Co.,** Wilmington, O. He succeeds **M. R. Denver,** who, for several years, had been inactive in the business. **V. G. Marconett,** former assistant secretary, was elected secretary. With the company since 1922, Mr. Sapp served successively as sales engineer, sales manager, and general manager.

—o—

Brainard Steel Co., Warren, O., increasing its board of directors from three to five members, elected as directors **E. N. Crosier,** secretary-treasurer, Sharon Steel Corp., and **Thomas J. Moore Jr.,** vice president and general manager of Brainard. **William J. Keegan** has joined the company as secretary and treasurer, and was formerly with National Enameling & Stamping Co., Milwaukee, where he was comptroller.

—o—

Harold D. Wright was elected chairman of the board, **Republic Coal & Coke Co.,** Chicago. **George J. Leahy** succeeds Mr. Wright as president. One of the co-founders of the company in 1919, Mr. Wright served as president since 1939, and was previously a vice president. Mr. Leahy became associated with Republic in 1934 as vice president in charge of sales, and became executive vice president in 1939.

MARVIN J. BAIR

Marvin J. Bair was appointed general manager of sales, **Thomas Steel Co.,** Warren, O., succeeding the late **William F. Rummell. Robert C. Lewis** succeeds Mr. Bair as assistant general manager of sales.

—o—

Henry W. Luetkemeyer, chief engineer, was elected vice president-engineering, and **Merrill A. Young,** personnel director, was elected vice president-personnel, **Cleveland Graphite Bronze Co.,** Cleveland. Elected a director of the company is **Robert H. Daisley,** vice president and director of manufacturing, Eaton Mfg. Co.

—o—

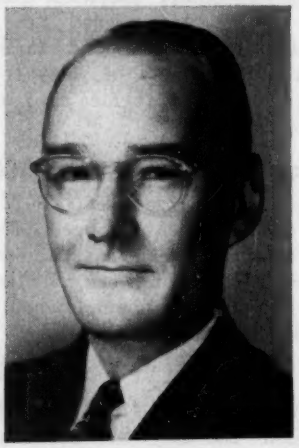
National Malleable & Steel Castings Co., Cleveland, promoted **George F. Wilhelmy,** formerly assistant sales manager, Cleveland railway division, to sales manager, and **Donald F. Kittredge** as assistant sales manager of that division. **Robert D. Sowers** becomes assistant sales manager, railway division, at Chicago. The company announces retirement of **George R. Farrell,** sales manager of the railway division at Cleveland, and with the company 43 years; and of **Frank E. Moffett,** assistant sales manager, railway division at Chicago, with the company 41 years.

—o—

A. King McCord was elected executive vice president, **Oliver Corp.,** Chicago. He has been first vice president since March, 1948, and active in the farm equipment industry since 1930 when he joined Oliver.

—o—

Russell W. Bill was appointed eastern sales manager in charge of the office recently opened in the Chrysler building, New York, for **Shakeproof Inc.,** division of Illinois Tool Works.



HERMAN P. RASSBACH

Herman P. Rassbach, former works manager, Midvale Co., has joined the Electro Metallurgical Division, **Union Carbide & Carbon Corp.,** New York, as metallurgical engineer with the development group. He will have headquarters in Chicago.

—o—

Walter A. Gorrell was elected director and executive vice president, **Bruning Bros. Inc.,** Baltimore. Long active in paint and allied fields he served with Sherwin-Williams Co., Cleveland, and as vice president and general manager of John Lucas & Co. Inc., Philadelphia. During the war he became president, E. J. McAleer & Co., continuing in that position until recently. While president of the latter company Mr. Gorrell served as a trustee and national president of Pressed Metal Institute, in addition to being chairman of the Philadelphia chapter.

—o—

H. A. Brassert & Co., New York, announces that **H. A. Brassert** continues as chairman of the board of directors. **C. A. Brassert** became president of the company and **B. L. Jones,** vice president.

—o—

Appointments at the Fontana, Calif., plant, **Kaiser Steel Corp.,** are: **J. W. Walling,** named assistant to the works manager; **Barney N. Dagan,** division superintendent, iron and steel. **W. F. Bowers Jr.** replaces Mr. Dagan as open-hearth superintendent. **Mitchell A. Thompson** was promoted to assistant superintendent, and **Richard Aubrey** was appointed metallurgical engineer, tubular products.

—o—

Jay Morrison was appointed manager, gas turbine project, **Boeing Airplane**

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A-7027

Co., Seattle. **S. D. Hage** will be chief project engineer for the turbine's further development.

—o—

E. J. Magee was appointed director of industrial relations, **Republic Steel Corp.,** Cleveland. He succeeds **J. A. Voss,** who submitted his resignation

E. J. MAGEE

following an extended period of illness. Mr. Magee has been acting director for the last several months. **R. H. Ferguson** was appointed assistant director of industrial relations, and is succeeded by **W. M. Nelson** as manager of Republic's safety program.

—o—

Daniel D. Schwartz was elected chairman of the board, **Beryllium Corp.,** Reading, Pa. Elected directors are **M. J. Donachie, O. T. Englehart, M. A. Hallam, R. M. Quimby.** Officers elected are Mr. Englehart, president, Mr. Donachie, vice president, Mr. Quimby, secretary, and **B. V. Edridge,** treasurer.

—o—

Automatic Sprinkler Corp. of America, Youngstown, re-elected to office **J. A. Coakley,** president, **C. B. Miller,** vice president, and **J. J. Power Jr.,** vice president. **J. A. Coakley Jr.,** formerly secretary and treasurer, was elected vice president and treasurer, and **L. C. Zimmerman,** formerly assistant secretary and auditor, was elected secretary and auditor. **Joseph C. Coakley** is assistant secretary.

—o—

Link-Belt Co., Chicago, elected **David E. Davidson** vice president for sales. He has been general manager of the Pershing road plant in Chicago since 1947. **Eugene P. Berg** succeeds Mr. Davidson.

—o—

W. O. Lange was appointed Florida representative, **Amerlux Steel Products Corp.,** importer of steel from Belgium and Luxemburg. His headquarters will be in Miami. For many years Mr. Lange was sales manager, Phoenix Iron Co., and subsequently was affiliated with Dreifus Steel Corp., Philadelphia.

—o—

Caterpillar Tractor Co. has promoted the following to positions in its new earthmoving equipment plant under construction at Joliet, Ill.: **Hubert D. Boggs,** named factory manager; **Walter J. Gottschalk,** personnel manager; **Robert A. Morgan,** chief accountant. **W. G. Schuller** will be purchasing agent for the Joliet operations, and **Otto F. Wiesemann,** production division manager.

—o—

Thomas E. Darnton was appointed assistant plant manager, forge plant of **Oldsmobile Division** at Lansing, Mich., General Motors Corp.

—o—

Christiansen Corp., Chicago, appointed **Walter Bonsack** as vice president and director of research, in charge of

WALTER BONSACK

technical operations and procedures of all company plants. He will also be responsible for correlation of the extensive aluminum research program planned by the company and its subsidiaries and affiliates.

—o—

John M. Stevenson has joined **Youngstown Sheet & Tube Co.** as a development engineer in its mill research and development department. For the present he will be located in the company's Tulsa, Okla., office, but later will be located in Dallas. For the time being he will concern himself principally with pipe line problems.

—o—

Colorado Fuel & Iron Corp., Denver, announces changes in its western division. **Robert F. Bourne** assumes the post of manager of rolled product sales. To fill the vacancy left by appointment of **James N. Counter** as general manager, commercial steel sales, in the division, **J. R. Caten,** district manager at Phoenix, Ariz., returns to Denver as division sales manager for the Rocky mountain division. **Luke Helms Jr.,** assistant district manager, Ft. Worth, Tex., becomes district sales manager at Phoenix.

—o—

Carnegie-Illinois Steel Corp., Pittsburgh, subsidiary, U. S. Steel Corp., appointed as chief engineer-construction engineering bureau, **Sigurd Landen,** and as chief engineer-operations, **Edwin L. Tindall. Charles J. Fleisch** was appointed assistant general superintendent, Homestead district works, and **William C. Bennett** was promoted to division superintendent in charge of the Homestead plant's blast furnaces located at Rankin, succeeding Mr. Fleisch. **Robert W. Graham** was appointed general superintendent of the company's Duquesne Works and **King H. McLaurin** transferred from that position to company's general offices in Pittsburgh as a special representative in the operating department.

—o—

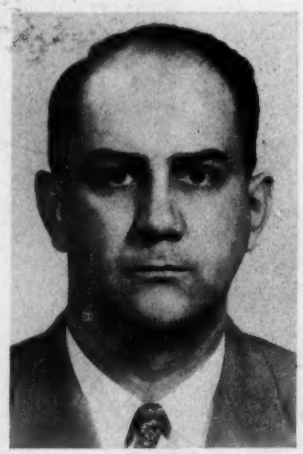
Donald W. McGill, former manager, machinery electrification section, industrial department, **Westinghouse Electric Corp.,** Pittsburgh, was appointed supervisor of sales training.

—o—

Anthony J. Potts was appointed Chicago district manager of **Selas Corp. of America,** Philadelphia.

—o—

J. A. Voelker, vice president, **Pittsburgh Steel Co.,** Pittsburgh, was placed in charge of sales.

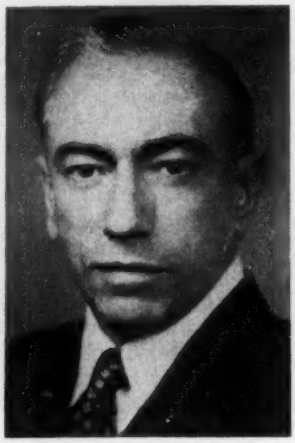


C. HEAMON CASTLE

C. Heamon Castle was elected vice president, **Roto-Finish Co.,** Kalamazoo, Mich., formerly known as Sturgis Products Co.

—o—

Douglas M. Considine was appointed manager, market extension division, general sales, for **Brown Instruments**



ROGER M. KYES

GEORGE H. FREERS

FRED B. CRONER

Division of Minneapolis-Honeywell Regulator Co., Minneapolis.

—o—

Roger M. Kyes was appointed a vice president of General Motors Corp., Detroit, and general manager of its **GMC Truck & Coach Division.** Assistant general manager in the division since October, he succeeds **Morgan D. Douglas,** on leave of absence because of ill health.

—o—

J. C. Jay, sales manager, **Safway Steel Products Inc.,** Milwaukee, was promoted to vice president in charge of sales, and **W. H. Mettelman,** secretary, was made vice president and controller. The company will expand to include a new line of aluminum alloy scaffolding.

—o—

Pittsburgh Metallurgical Co. Inc. appointed **Stuart C. Du Tot** general manager-sales. He will have offices in the Oliver building, Pittsburgh, and headquarters at the home office in Niagara Falls, N. Y.

Marmon-Herrington Co. Inc., Indianapolis, elected **George H. Freers** vice president in charge of engineering, and **Fred B. Croner,** vice president in charge of procurement. For the last ten years Mr. Freers has been chief engineer, which period included the company's complete conversion to manufacture of military vehicles during the war. Mr. Croner for the last three years has been responsible for the company's purchases of materials and supplies.

—o—

J. J. Sullivan was appointed superintendent, **Republic Steel Corp.'s** 98-inch hot strip mill, Cleveland. He succeeds **W. M. Ramsay,** resigned.

—o—

Sidney J. Wolf was named president of the newly organized **Jessop Steel Sales Co.,** Detroit, which will act as representative in Michigan for Jessop Steel Co., Washington, Pa. He has been identified with Michigan industry for many years through Industrial Smelting Co. He also was appointed a director of the company, as was **Douglas G. Mode,** Midland, Mich., attorney.

—o—

John W. Todd, for many years Pittsburgh district manager of sales, Dreifus Co., has joined **M. N. Landay Co.,** Pittsburgh.

—o—

Morrison Steel Products Inc., Buffalo, appointed **Adolph S. Pezoldt Jr.** as purchasing agent. He will work under supervision of **M. Jacque Kohnstamm,** vice president and director of purchases, who assumes the new duties of assistant to the president. Mr. Pezoldt for the last 14 years has been executive assistant to the purchasing agent, Mack Mfg. Co.

—o—

Duff-Norton Mfg. Co. appointed **Charles R. Ellicott Jr.** as eastern district sales manager with headquarters in New York. He formerly held sales engineering positions with Westinghouse Electric Corp. and Symington-Gould Corp.

OBITUARIES...

Joseph R. Gorman, 70, president, **Transue & Williams Steel Forging Corp.,** Alliance, O., died Apr. 3.

—o—

Alphonse O. Rousseau, 61, abrasive products safety engineer, **Norton Co.,** Worcester, Mass., died Mar. 27.

—o—

Stanley H. Eichelberg, 56, superintendent of planning at the **Dodge Division** of Chrysler Corp., Detroit, died Apr. 2.

—o—

C. H. Buckmaster, 43, district manager, **Lincoln Electric Co.,** in Detroit, died Mar. 27 as a result of injuries received in an automobile accident. He had been in the Lincoln sales department for 20 years, 16 of which were spent in the Detroit area in development of welding in the tool and automotive industries.

—o—

Thomas B. Russell, president, **Acme Machine & Tools Ltd.,** Toronto, Ont., Canada, died Mar. 30.

—o—

R. R. Campbell, 56, assistant manager of production planning for **Aluminum Co. of America,** Pittsburgh, died Apr. 2.

—o—

Allen F. Petrie, 43, manager, supply and inventory, farm tractor division, **International Harvester Co.,** Chicago, died Mar. 19.

Raymond T. Melville, 67, district sales manager for **Hanna Furnace Corp.,** Buffalo, died Mar. 28.

—o—

William J. Kennedy, 49, plant manager, **Magnus Metal Co.,** Depew, N. Y., died Mar. 27.

—o—

George F. Morrissey, 61, assistant treasurer, **Habirshaw Cable & Wire Corp.,** Yonkers, N. Y., division of Phelps Dodge Copper Products Corp., died Apr. 2. He was with the copper company 30 years.

—o—

Eugene L. Messler Sr., president, **Eureka Fire Brick Works,** Pittsburgh, died Mar. 1.

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ALLISON DIVISION, G. M. C.
AMERICAN CAR & FOUNDRY
CURTISS-WRIGHT
EUCLID ROAD MACHINERY
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INTERNATIONAL HARVESTER
PRATT & WHITNEY
THOMPSON PRODUCTS
WESTINGHOUSE

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Production AND Engineering
NEWS AT A GLANCE

CONTROLLED CONDITIONS—A special air-conditioned room is used during cutting operations involving more than 700 teeth of a huge marine reduction gear, 13 feet in diameter and weighing 53,000 pounds, at the South Philadelphia Works of Westinghouse. The controlled atmosphere is a vital factor in obtaining absolute accuracy in the pitch, position and dimensions of each tooth. The process never stops day or night for three weeks, because the cutting tool generates heat, and if cutting is restarted after the metal cools and contracts, all subsequent teeth will be slightly out of position.

SHORTCUTS DRAWING REPRODUCTIONS—Large savings in cost of reproducing engineering drawings are possible through use of a commercial process known as Xerography which the Air Materiel Command has found adaptable to reproducing from microfilm the thousands of detailed drawings required each year. Method involves the use of a charge of static electricity on a sensitive metal plate. The Department of Defense estimates original reproduction through its use will be less expensive as well as space saving.

MINIMIZES BRITTLE ZONES—Fully machinable welds on cast iron can be made with an improved electrode developed by General Electric Co., Schenectady, N. Y. The rod is composed of pure nickel-core wire and an extruded black coating which is consumed in the arc giving a low volume of slag. Its stable arc provides weld deposits that are color matching and of machine-like appearance and which also offer increased resistance to cracking. Designed to operate on either low alternating or direct currents, the electrode minimizes brittle heat affected zones in base materials.

MEASURES "SECOND-SOUND"— Scientists at National Bureau of Standards recently settled an international controversy of basic theoretical importance in the perplexing field of low-temperature research. This they have done by measuring for the first time the velocity of "second-sound"—that unique process by which heat is transferred through helium II—at temperatures well within one degree of absolute zero. Besides settling the international controversy, their results clear the way for further research at super-low temperatures. The work opens up possibilities of getting to extremely low temperatures in studing properties of matter by new methods.

STEMS CORROSION—A new vinyl resin formulation for pretreatment of metals scheduled for water-submerged service is reported by Dampney Co. of America, Boston. Material is said to serve two functions: It inhibits corrosion temporarily prior to finish coating, and provides improved bonding of the subsequent finish. It also meets requirements for such applications as water-storage tanks, condensers, locomotive tender cisterns and wherever metal is exposed to fresh or salt water at temperatures to 140° F. The rapid-drying, one-coat primer is readily applied by brushing or spraying.

NO CASTING SLOW-UPS—Because die castings are comparatively small and casting machine speeds high, many bottlenecks can be created unless something is done to keep the work as well as the remelt material moving. To overcome possible slow-ups, the Stewart Die Casting Division, Stewart-Warner Corp. is gradually converting to mechanized handling. Already its main lines in the zinc department are operating on an automatic basis and considerable progress in the same direction is being made in the aluminum section. (p. 82)

CUTS FUEL COSTS 40%—Use of special furnaces in dry cyaniding operations is cutting fuel costs by 40 per cent in the Detroit plant of Commercial Steel Treating Co. Combination of efficient gas firing under constant automatic control provided by the new units, nominal cost of prepared gas atmosphere in relation to weight of materials treated, ease of operation, labor savings and good housekeeping are some of the other major contributions to dollar savings. (p. 85)

CREEP OF INGOT IRON—In a Bureau of Standards investigation involving influence of strain rate and temperature on mechanical properties of Monel metal and copper during creep, it was observed the third stage of creep was sometimes initiated by formation of microscopic cracks. With sufficiently slow strain rates at high temperatures the specimens—both face-centered cubic metals—failed without necking. During investigations of cold drawn ingot iron—a body-centered cubic metal—it was found considerable necking occurred in each specimen although strain rate was controlled and maintained nearly constant in the third stage. (p. 88)

SERVE DOUBLE PURPOSE—Originally, soaking pits were merely holes in the ground into which hot ingots were placed and allowed to equalize in temperature prior to rolling. But as specification and quality requirements become more stringent and the many presently available alloy grades of steel were developed, it was found necessary to control rolling temperatures more precisely. Today, soaking pits are constructed so they may be either used as a soaking pit or as a heating furnace. (p. 102)

Mechanized Handling Reduces Die Casting Production Costs

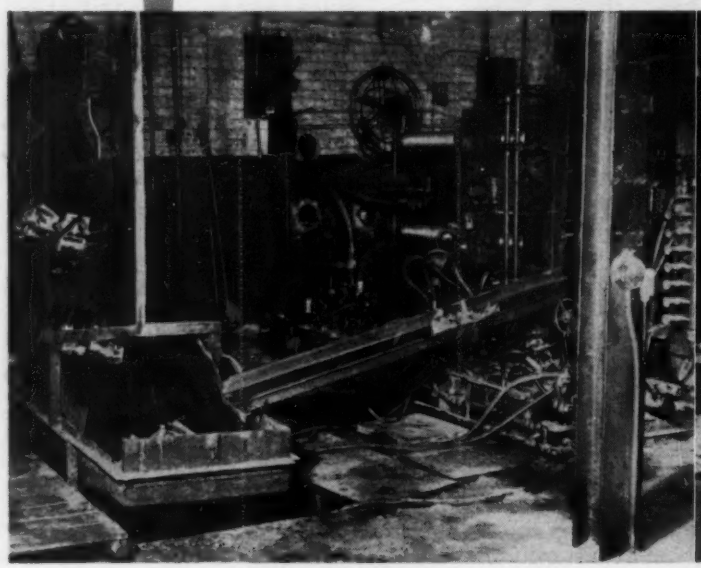


Fig. 1—Zinc die castings move from the casting machine via a gravity chute and inclined belt conveyor to degating and inspection on the opposite side of the wall

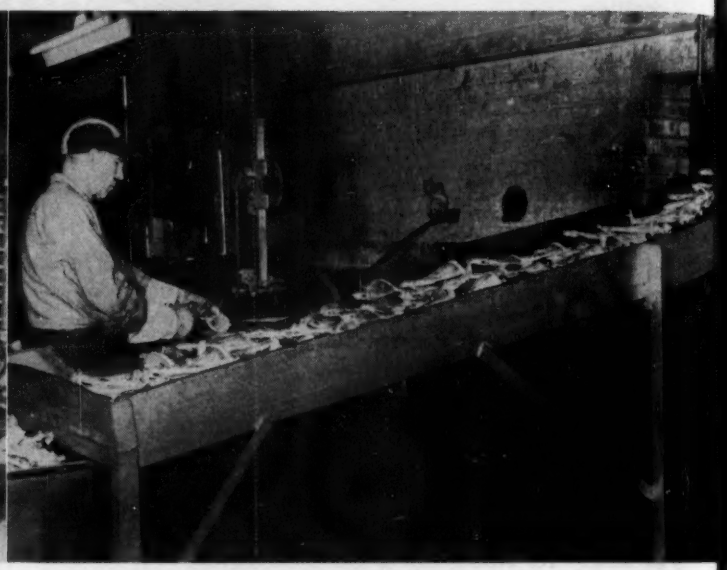


Fig. 2—Gates are broken off or removed by bandsaw. Castings are placed in tote boxes; remelt material goes onto the horizontal steel apron conveyor against the wall

Fig. 3—From the overhead storage hopper, the remelt drops by gravity to two melting furnaces. Molten metal is then transferred to casting machines

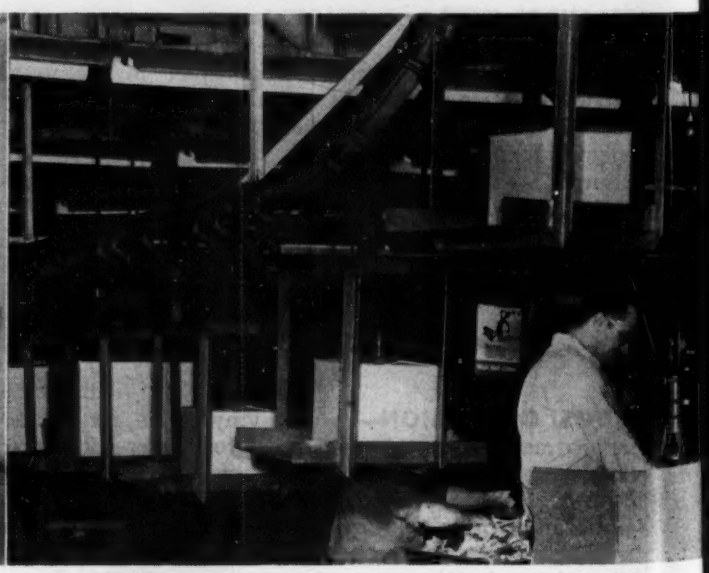


Fig. 4—Finished castings are packed in cartons and transferred to the shipping department on carriers on an overhead chain conveyor

Stewart-Warner installs monorail conveyors, belt conveyors and other handling devices in applying mass production techniques to making aluminum and zinc castings

By E. F. ROSS
Chicago Engineering Editor, STEEL

Photos by Dan Reebel

MASS PRODUCTION die casting plants offer interesting possibilities for mechanized materials handling not only for efficient movement of the product itself but for the remelt material as well. Because die castings are comparatively small and casting machine speeds are high, hourly output counted in pieces reaches near astronomical totals. Correspondingly, the remelt metal in the form of gates, overflows, trimmings and mis-runs, aggregates substantial volume.

One of the largest jobbing die casting plants in the Midwest is the Stewart Die Casting Division, Stewart-Warner Corp., Chicago. It produces zinc and aluminum castings ranging in weight from a fraction of an ounce to approximately 13 pounds. These castings, many of which are intricate in design, are made to customers' specifications for use in the automotive industry, for electric appliances, cameras, moving picture projectors, radio and television sets, hardware, and the like.

Modernization Program—Recently the company undertook a program to improve and modernize its operations through installation of conveyors and mechanical handling equipment for producing and finishing die castings and returning remelt material to the melting department. The main lines in the zinc department are now mechanized and considerable progress in the same direction has been made in the aluminum department. Plans for further mechanization of facilities are under way. A considerable part of the equipment was designed and installed by the company's own engineers.

All of the improvements effected so far have contributed to appreciable savings in the production of both zinc and aluminum die castings, these savings, of course, serving to partially offset rising costs of a noncontrollable nature. L. G. Vanderhoof, die casting division manager, reports that additional consideration now is being given to handling facilities as related to each specific operation or piece of equipment to permit co-ordination of the overall handling scheme.

The conveyor system in the zinc die casting department serves a battery of large casting machines lined up at right angles to a brick wall which separates the casting department from the finishing department. Typical of the machines in this line is No. 1, shown in Fig. 1. This is a semiautomatic unit in which a push on a button makes one shot. Depending upon weight and shape of the castings, it is possible to make as many as 400 shots per hour.

The casting in production at the time the photograph was taken was an automobile steering column bracket. When a casting is ejected from the die, the operator, whose station is on the side of the machine away from the camera, grasps the casting with tongs and deposits it on a gravity chute immediately opposite him on the back side of the machine. Sliding down this chute, as shown in Fig. 1, the castings drop onto an inclined belt conveyor. Belt of this conveyor is rubber-coated and as the castings are elevated by it they are cooled by water spray.

Inspection Chute—Extending through an opening in the wall, the belt conveyor deposits the castings on a horizontal inspection chute shown in Fig. 2. An operator standing at the lower end of this chute removes the gates and overflow metal and inspects the castings. Where the gate is of such size or type that it can not be broken off readily, it is removed by bandsaw as shown in the illustration. Degated and inspected castings are deposited in tote boxes placed in an aisle passing along the lower end of the gravity chute. Gates and overflow metal are dropped into a short chute shown just behind the bandsaw, and fall onto a horizontal steel apron conveyor installed against the brick wall and serving the inspection chutes of all casting machines in the battery. This conveyor was built by Samuel Olson Mfg. Co. Inc., Chicago.

Zinc remelt falls from this conveyor through an opening in the floor to be deposited on the lower end of an inclined steel conveyor to be elevated to an overhead storage hopper.

Installed at the junction of the horizontal and inclined conveyors is a steel mesh gate, hinged at the left. Remelt, mostly zinc trimmings from the cleaning departments, is brought to this point in hand trucks; when the gate is swung open it is dumped onto the inclined conveyor. The steel frame which mounts the conveyor electrical controls serves as a guard to prevent the trucks from slipping into the conveyor during dumping. The gate is equipped with an automatic lock to permit its being opened only when the conveyors are in operation. This is a safeguard against dumping when the conveyors are idle and causing a jamming up. A bell rings continuously when the gate is open or unlatched, prompting the workman to swing it shut after he has finished.

Overhead Hopper—The overhead hopper is approxi-

mately 30 feet high and 10 feet in diameter and has a capacity for about 30,000 pounds of metal. It is located in one end of the melting room. From a gate in its bottom the remelt feeds into a chute to fall into a double ended trough. Each end of the trough is immediately over a melting furnace. This trough arrangement and the two furnaces are shown in Fig. 3. The remelt material rests in the center of the trough and the operator employs a hook to pull it into the melting pots as it is needed. Virgin metal is added to the pots in ingot form as required to maintain chemical specifications.

Seven 6000-pound Fisher gas-fired furnaces are installed in the melting room, these including the two which are charged from the hopper just described. Three of the furnaces are employed for alloying. The furnaces are so placed in the melting room as to be served by a monorail carrying two 600-pound ladles supported on chain hoists. Molten metal is transferred from the furnaces to the monorail ladles by hand ladles.

The monorail emerges from the melting room into a switch and thence into two parallel monorails, each of the latter serving a battery of die casting machines on either side of an aisle. Automatic stops are provided on the monorail to prevent accident in the event of open switch. Ladles of molten zinc are transferred from the melting room via the monorails to replenish the pots of individual die casting machines. Because of the centralized hot metal supply, the pots of the casting machines are heated only as required to maintain the metal at proper casting temperature.

Trimming and Finishing—Die castings which were placed in tote boxes at the degating and inspection chutes are moved across the aisle to the punch presses where they are trimmed and finished. This includes drilling, tapping, milling, filing and similar operations that are called for by customer specifications. The castings also undergo their inspection in this department.

At the end of the finishing line, the castings are packed in cartons and the cartons are placed in carriers on a chain conveyor which moves overhead to the shipping department. Fig. 4 shows cartons starting on their way to the shipping department. Here the cartons are unloaded from the carriers for weighing, sealing and addressing. The shipping dock is adjacent to the shipping room.

Fig. 5 is a view in the aluminum die casting department. Materials handling varies somewhat from the practice employed in the zinc die casting department. As castings are removed from the casting machine, the operator places them on an inspection table or chute. The inspector picks up the individual castings, inspects them and suspends them on hangers on a Richards-Wilcox overhead conveyor to be transported to a central breakoff department. Moving from bench to bench, one inspector is able to inspect and place on the conveyor the output of several casting machines.

Fig. 5—In the aluminum die casting department, the inspector examines castings and places them on hangers on an overhead conveyor to go to a central breakoff. One inspector handles the output of several casting machines

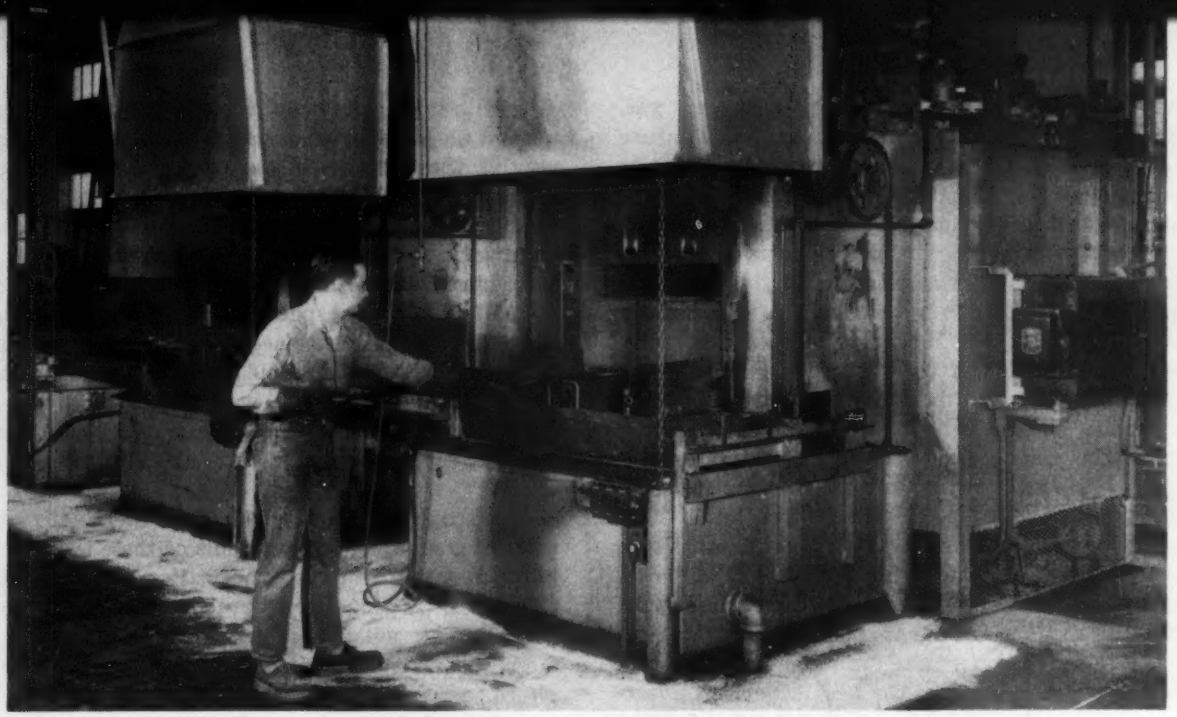


Fig. 1—Two of the three Dow furnaces for gas cyaniding. These furnaces are gas-fired with radiant tubes, controlled atmospheres and full automatic temperature, quench and forced atmosphere circulation

SPECIAL GAS FURNACES

Cut Fuel Costs, Improve Dry Cyaniding

Efficient automatic gas-fired batch type units give one large steel heat treater operating advantages in case hardening a wide variety of steel parts

INSTALLATION of three new gas-fired radiant tube atmosphere furnaces is improving efficiency in gas cyaniding, gas carburizing and clean hardening operations at the Detroit plant of Commercial Steel Treating Co. Using prepared atmospheres for cyaniding, the new Dow Furnace Co. units are reported to be capable of saving 40 per cent in fuel costs. The combination of efficient gas firing under constant automatic control, the nominal cost of prepared gas atmosphere in relation to weight of materials treated, ease of operation, saving of labor, and good housekeeping are some of the major contributions to dollar savings.

The Commercial organization processes more than a million different metal parts annually. These include marine engine, aircraft, automotive and machine tool parts, precision gages, plastic dies and molds, laminations, broaches, high speed cutting tools, punches, mounts, jigs and fixtures and numerous other items which must be able to withstand wear and possess a specified tensile strength.

Radiant Tubes—The new furnaces are heated by six vertical "U" type radiant tubes, equipped with a

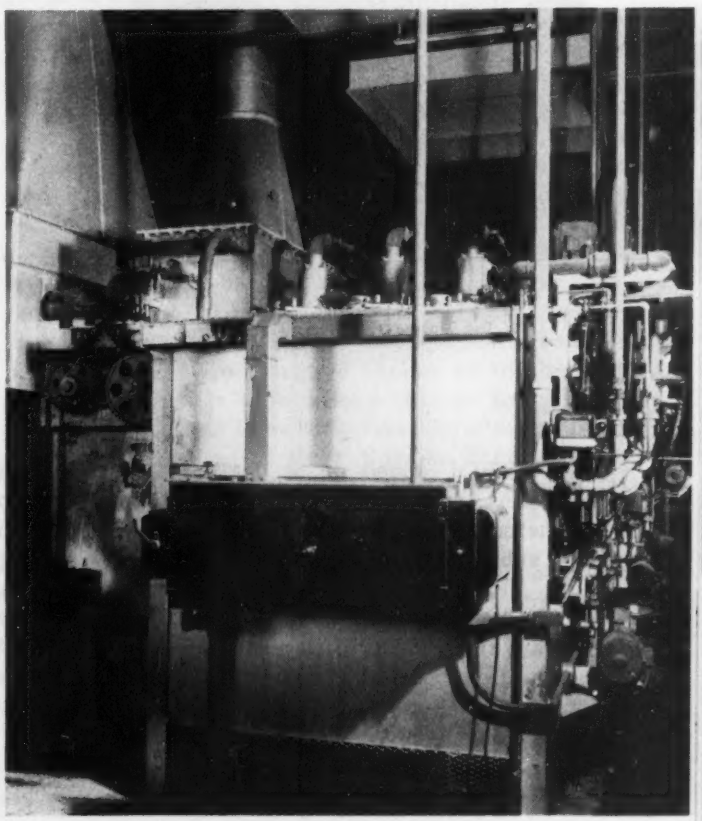


Fig. 2—All controls are located along the backs of the furnaces leaving the front and sides clear for plant operations. One of the advantages of gas cyaniding is the cleanliness of the process

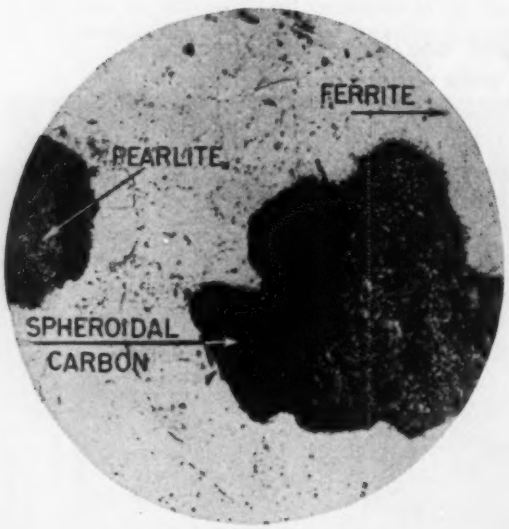
burner of special design, and fired by natural gas. Fuel is carried to the burner in an air-gas mixture having a ratio of approximately two parts of air to one part of gas, to which is added in the burner sufficient additional (secondary) air to form a 10 to 1 ratio. Features of the burner design include intimate mixing of the gas and air, promoting complete combustion and a long flame resulting in uniform heating throughout the length of the radiant tube. These features result in the maximum extraction of heat from the fuel and in increased radiant tube life through the elimination of hot spots.

Surrounding the radiant tubes is a structure designated as a "heat capacitor" which consists of a refractory mass of a special shape. The term "heat capacitor" is derived from the fact that the structure stores up heat during the firing cycle, to be given up to the cold stock at the beginning of the next cycle. Weight and surface of the refractory mass is carefully calculated to offer the desired combination of effects. Through the use of the heat capacitor, greatly increased surface area is exposed to the radiant tubes to pick up heat by radiation and to give up this heat to the circulating atmosphere by convection.

Gas Atmosphere—The gas atmosphere used consists of a carrier gas high in CO, natural gas to furnish the carbon, and ammonia to furnish the nitrogen, in percentages to give the desired alloy. A circulating fan is installed to move the atmosphere around all sides of each part in a furnace charge; it assures that new, rich gas constantly flushes away and replenishes the spent gas from which the carbon has been given up to the stock. Thus a uniform carbon content is in the case at all points of a part, and from part to part throughout the furnace charge. By circulating the atmosphere effectively, in combination with the factors mentioned above, it assures uniform heating, as well as rapid heating throughout the charge. This is absolutely essential in order that very light case work (in the range of 0.003-inch case) may be run with results that are uniform and consistent.

Furnace load is quenched from the exit vestibule without contacting air by means of the elevator. Thus both oxidation and decarburization of the stock is prevented. A propeller mounted at the bottom of the quench tank pulls oil down through the load, in a manner similar to the atmosphere circulation described above, assuring an effective and uniform quenching of bulk loaded parts.

One major cause of distortion during hardening is nonuniform quenching. Although the Dow quenching system cannot guarantee the complete elimination of distortion, field history has indicated that distortion is reduced materially over conventional quenching practice.



Chambersburg Engineering Develops New

DUCTILE CAST IRON

MAGNESIUM added to a high-carbon cast iron transforms the graphite from the normal flake form to spheroidal form, resulting in high tensile strength and a substantial amount of ductility in a new casting alloy. A development of Chambersburg Engineering Co. of Chambersburg, Pa., the new material is said to retain the self-lubricating properties and much of the vibration-dampening properties of cast iron, while virtually eliminating the inherent weakness which results from the notch effect of flake graphite.

As the result of much development work, the company, which also produces forging equipment, has produced castings weighing up to 40,000 pounds which in addition to the above advantages have a high yield strength and high elastic modulus. The metallic matrix of the material is said to be essentially steel, which can be produced with appropriate microstructures to give desired physical properties. It is also subject to heat treatment for alteration and improvement of physical properties.

Specifications—To be marketed as ductile Cecolloy, the alloy is produced to specifications within the following physical properties as cast: Tensile strength, 60,000 to 80,000 psi; yield strength, 40,000 to 60,000 psi; elongation, 0 to 15 per cent; modulus of elasticity, 22,000,000 to 25,000,000 psi.

Weight reduction made possible by its high strength will, it is thought, result in economies over cast iron construction in many cases. It is expected that further economies will result from its substitution for cast steel where physical properties permit. Machinability is said to equal cast steel; fine finishes are possible.

SEEN AND HEARD IN THE Machinery Field

By GUY HUBBARD
Machine Tool Editor

GLEASON WORKS' 85TH: Of the few existing machine tool companies which date back to the days of the Civil War, still fewer came into being as out-and-out machine tool builders. Most of them began building machine tools as "by-products" of other manufacturing activities such as guns, clocks, sewing machines, textile machinery, waterwheels and steam engines.

One man in particular who deserves credit for having launched a real machine tool building company back at the dawn of the kind of metalworking that we know today, was the late William Gleason. In 1865 he established on Brown's Race below the lower falls of the Genesee river in Rochester, N. Y., a shop which employed 50 men on the manufacture of lathes, planers and certain other machine tools.

On Saturday, April 8, 1950, I had the great pleasure of being one of several hundred guests of the Gleason family on the 85th anniversary of the establishment of the Gleason Works, one of Rochester's outstanding industrial plants and one which has had worldwide influence in improvement of machinery of all kinds through its achievements in the design and production of bevel gears and related products.

This demonstration of respect to an old but extremely virile member company of the machine tool industry and to one of the oldest but most vigorous family groups active in that industry, took place only four days after the 114th anniversary of the birth of the founder. If William Gleason could return to the land of the living, he certainly would be gratified to see the manner in which the second and third generations of the family have carried on the gear machinery traditions which he started with the invention of his "bevel gear planer of form copying type" in 1874.

This was one of those rare machine tools which sprung practically full-fledged from the brain of its inventor, and one which is the basis of similar machines today—regardless of how complicated they may look as compared to their "ancestor". That ancestor, incidentally, exists today in working condition as one of the important exhibits in the Ford Museum at Dearborn. That is a fitting place for it, because its influence on automobile development was incalculable.

It has been my good fortune to know two of the Gleasons of the second generation—Mr. James E. Gleason, now chairman of the board and his sister, the late Miss Kate Gleason, who long was secretary of the company. All of us who know Mr. James Gleason, respect him as one of the "elder statesmen" of the machine tool industry who somehow is able to associate the dignity of his years and his achievements with a rare degree of friendliness.

All of us who knew Miss Kate Gleason remember her as one of the first women to engage actively in the practice of machine tool design, machine tool building and machine tool selling. She also was the first woman with the courage and persistence to "batter down the gates" of one of the national engineering societies—which before her time had been closed to women.

One of the basic Gleason beliefs is that "obsolescence and unemployment go hand in hand—the hope of the future lies in new things." Founder William Gleason, his son James and James' son E. Blakeney Gleason, now president and general manager of the company, not only have preached that belief to their customers but also have practiced it themselves. After my memorable day at their big, modern plant at 1000 University Avenue, my conviction is that in that belief the Gleason's have discovered the "elixir of life" for the machine tool industry.

PHILADELPHIA TOOL ENGINEERS: Back in the great days of industrial activity of such figures as William and Coleman Sellers and William Barnes Bement, Philadelphia was the largest machine tool building center in the United States. With the westward drift of heavy machinery manufacturing, the "City of Brotherly Love" lost its outstanding place as a machine tool center—but what it lost in that respect it has more than made up for in the broader field of tool engineering.

Such is my conviction after observing the wave of tool engineering talent which has poured into the big ASTE tool show, and after studying the highly diversified group of metalworking plants in Philadelphia which have thrown open their doors to thousands of visiting industrialists throughout the week of April 10. For example, my own "visiting list" runs the gamut from a manufacturer of steel pens to that of railway locomotives. Incidentally, the founder of the locomotive company started out as a watchmaker —which goes to prove that if you get involved in tool engineering you never know where you will wind up.

Matthias Baldwin was a tool engineer for the simple reason that he believed that the same principles of interchangeability which already were being applied in the making of watches more than 100 years ago, likewise could be applied to the building of locomotives. It took a long time to bring about that happy result—one important by-product being the standardization of screw threads. That did more to bring order out of industrial chaos than any other one event since Eli Whitney initiated the American system of manufacturing.

Upon the urgent recommendation of Philadelphia's venerable Franklin Institute, it was Philadelphia's Sellers thread which was adopted as the standard in 1868. Quite in keeping with Philadelphia's ancient and honorable traditions in tool engineering is the fact that the general manager of the locomotive works founded by tool engineer Matthias Baldwin, today is James R. Weaver, past president of the American Society of Tool Engineers.

Creep Testing

COLD DRAWN I

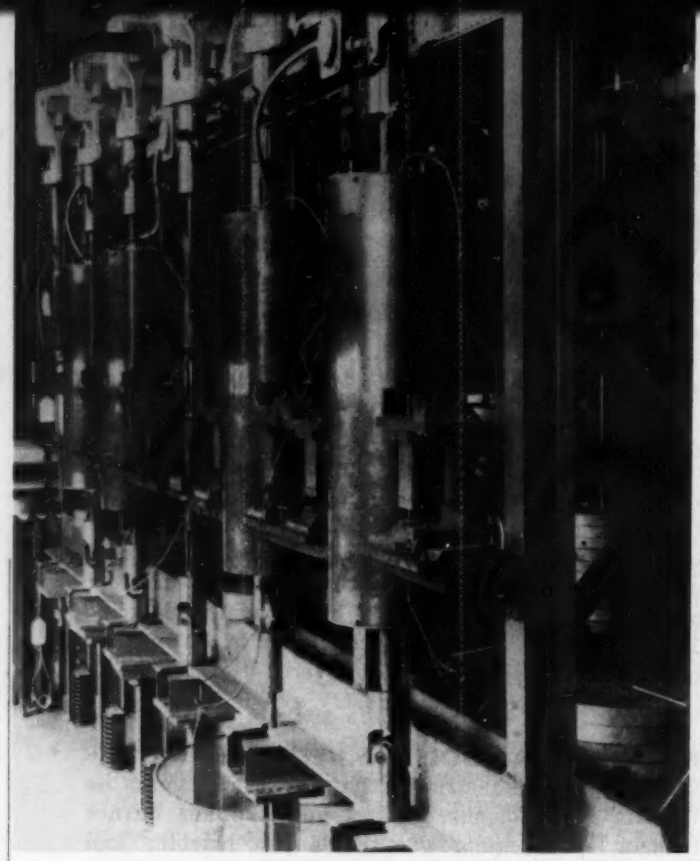


Fig. 1—Apparatus for creep test of ingot iron consists of static tensile testing units fitted with a furnace for maintaining the specimen at uniform and constant temperature. Loads are applied through specimen adapters and universal joints at each end of the specimen by means of the loading framework which rests on compression springs to reduce vibration. Extension and changes in diameter of the specimens are determined by an optical extensometer

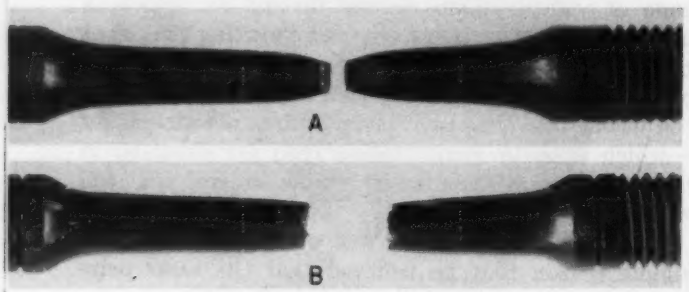


Fig. 2—Specimens after fracturing in creep. Specimen A was tested at 600° F with a strain rate of 38% per 1000 hours. Necking extended over a considerable portion of the gage length. Specimen B was tested at 700° F with a strain rate of 46% per 1000 hours. Necking was confined principally to the region near the fracture

ANY metal will deform continuously under a constant stress, i.e., will "creep" if the temperature is sufficiently high. In a previous investigation at the National Bureau of Standards involving the influence of strain rate and temperature on the mechanical properties of Monel metal and copper during creep, it became evident that the ductility of both metals increased with increase in strain rate and with decrease in temperature. It was further observed that the third stage of creep* was sometimes initiated by the formation of microscopic cracks. With sufficiently slow strain rates at elevated temperature, specimens of Monel and copper failed without local contraction (necking). Because both metals are face-centered cubic metals, the creep-testing program was extended to include a study of effect of strain rate and temperature on the behavior of cold-drawn ingot iron, a body-centered cubic metal.

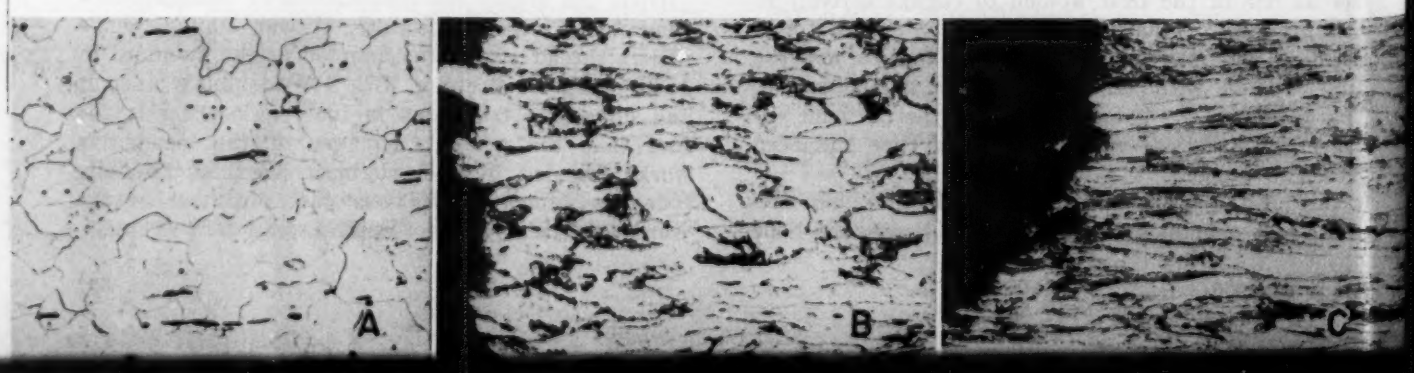
Strain Rates—Creep tests were made at different strain rates and temperatures on ingot iron initially cold-drawn to approximately 13 per cent reduction in area. Some tests were discontinued after the beginning of the third stage of creep; these specimens were subsequently tested in tension to fracture at room temperature.

In carrying these specimens to fracture, the rate during the third stage was maintained approximately constant and equal to that in the second stage by adjusting the load. This procedure of maintaining a constant rate beyond the beginning of the third stage was essential in determining the effect of strain rate on ductility at fracture.

Each specimen tested in creep was heated in air to the desired temperature and held for 48 hours before loading. The load was applied in selected increments

* The three consecutive stages of creep are: (1) Creep at a decelerating rate following initial loading, (2) creep at an approximately constant rate, (3) creep at an accelerating rate leading to fracture.

Fig. 3—Photomicrographs showing ferrite grain size of cold-drawn ingot iron and typical structures at fracture of specimens tested in tension at different temperatures and strain rates; longitudinal sections, etched in nital, X100. (A) Cold drawn; average ASTM grain number lower 5. (B) Tested at 600° F; 1.6% per 1000 hours strain rate; 16.5% elongation in 4 inches; 56.6% reduction in area. (C) Tested at 600° F; 1340% per 1000 hours strain rate; 65.1%



INGOT IRON

Recent studies at National Bureau of Standards reveal that resistance of the metal to fracture increased with an increase in the strain rate. Resistance to creep increased as the test temperature decreased

in order to produce a nearly constant rate of extension of 30 to 50 per cent in 1000 hours until the desired ultimate load for testing was attained. Thereafter the load was not changed in any specimen until the test was completed or the third stage was reached.

Time-Extension Curves—Time-extension curves for specimens tested to the third stage of creep revealed that the change in extension with time during the second stage frequently does not occur uniformly but varies in a cyclic manner. During a cycle, the change in extension often ranges from relatively high to low or negative values. Frequency and amplitude of these cycles apparently depends upon the temperature, strain rate, and elapsed time in the second stage of creep. The trends were (1) a decrease in the amplitude and frequency of the cycles with an increase in either temperature or strain rate and (2) a decrease as the deformation or time approaches the beginning of the third stage. At sufficiently high strain rates and temperatures, strain aging is not manifested in the shape of the extension-time curve and the rate is nearly constant in the second stage. These cycles, it is believed, result from a combination of strain hardening, strain aging and recovery of the iron.

Relation between true stress and creep rate in the second stage was shown in experiments at different temperatures. With the selected rate of loading (30 to 50 per cent extension in 1000 hours), the experimental values obtained at test temperatures of 600°, 700° and 800°F did not fall on a straight line when plotted on logarithmic co-ordinates. Instead, the curves drawn through the experimental values deviated from linearity by bending downward with the slower, and upward with the higher ranges in strain rate used at each temperature.

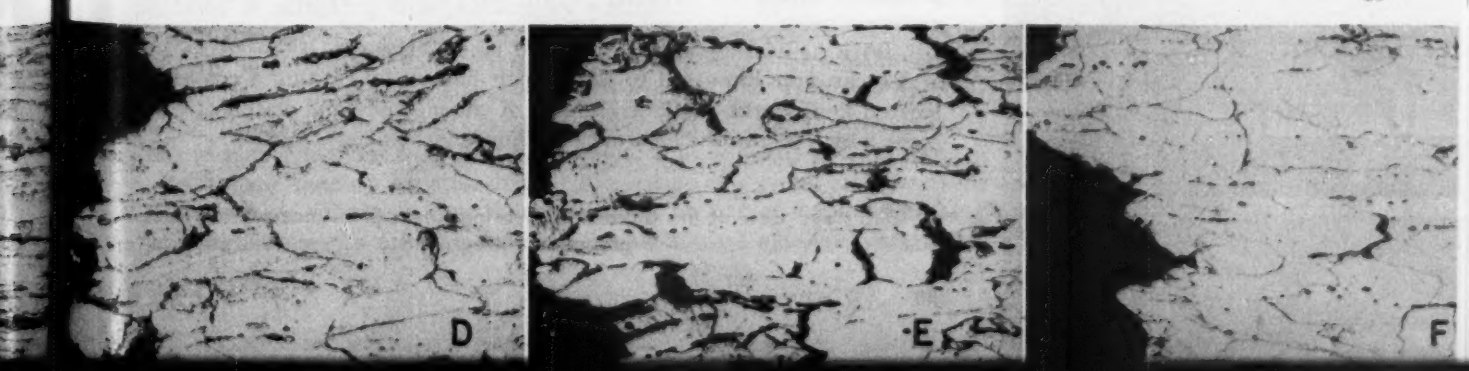
Although these stress-strain rate curves follow the same general pattern, the curves are not parallel and the relative positions where the bends occurred were influenced by the temperature of testing. The pronounced downward curvature was shifted to a lower creep rate as the temperature was changed from 600° to 700°F and the upward curvature to higher rates as the temperature was decreased. Similar trends were shown in the curves when the experimental values for true stress were plotted against the logarithm of the strain rate.

For the initially cold-worked ingot iron, the use of a linear relationship in either a log-log or semilog plot of true-stress versus strain-rate is not justified for extrapolating to slow strain rates (long service life) at 600° or 700° F. In general, resistance of metal to fracture increases with increase in strain rate.

Effect of Temperature—Effect of temperature on the resistance to creep of ingot iron was revealed by a comparison of several stress-strain rate curves. From these it was obvious that the resistance to creep increased as the test temperature decreased. Resistance to creep at 700°F was materially increased by decreasing the rate of extension in the first stage during loading from about 40 per cent in 1000 hours to 3 per cent in 1000 hours; the plastic extension at fracture was also affected by this change in loading rate.

Although the strain rate was controlled and maintained nearly constant in the third stage of creep, considerable "necking" occurred in each specimen tested to fracture. In some cases, the necking was confined principally to a relatively narrow region in the vicinity of the fracture, whereas in other specimens there was a more gradual necking over a considerable portion of the gage length. Both the extension and reduction of area at fracture were affected by the manner in which the specimen necked but not necessarily to the same degree.

Specimens Unloaded — Specimens tested into the third stage of creep (not fractured) were unloaded and then cooled in the furnace to room temperature. A summary of the results of measurements made at room temperature for change in diameter over the entire gage length and the determination of extension during creep showed no evidence of local contraction or visible surface cracks in any of these specimens except one, which revealed only a slight indication of necking. In another specimen tested (at



elongation in 2 inches; 82.5% reduction in area. (D) Tested at 700° F; 2.63% per 1000 hours strain rate; 16.4% elongation in 4 inches; 44.7% reduction in area. (E) Tested at 700°F, 3.00% per 1000 hours strain rate; 11.2% elongation in 4 inches; 45.4% reduction in area; loaded slowly. (F) Tested at 800° F, 42% per 1000 hours strain rate; 9.2 per cent elongation in 4 inches; 42.3 per cent reduction in area

500°F) to nearly the end of the third stage, no evidence of cracking was observed in a metallographic examination at 500 and 1000 diameters of the necked section extending from the axis to the surface. Thus, the third stage of creep began without necking or without the presence of cracks of microscopic dimensions. However, regardless of the rate of extension, some necking occurred in the third stage of creep in each specimen tested to complete fracture.

Fractures of the specimens tested at 600°F with strain rates of 1.6 per cent, 380 per cent, and 1340 per cent in 1000 hours were essentially transcrystalline, while the fractures of all specimens at 700° and 800°F were predominantly intercrystalline. Maximum distortion of the grains during creep was obtained in a specimen tested at 600°F with a relatively high strain rate. Cracking in this specimen, which had a pronounced neck and relatively high ductility, was observed only in the regions of complete separation. Appreciable elongation of the grains also occurred in another specimen tested at 600°F with a creep rate of 1.6 per cent in 1000 hours but there was some separation of the grains in regions away from the position of complete fracture. The general trend was for the flow to increase with a decrease in test temperature and to increase with an increase in strain rate. Tendency for the ferrite grains to separate in the regions away from the portion of complete fracture was promoted by decreasing the strain rate and by increasing the temperature.

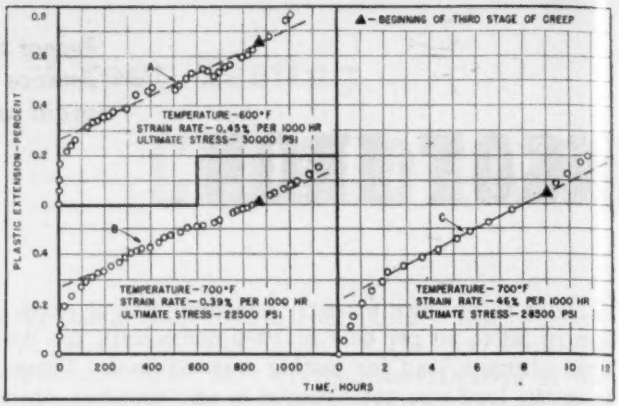


Fig. 4—Extension time curves for specimens extended into the third stage of creep

AUTOMATIC SHEARING

Steps Up Production 33 Per Cent

AUTOMATIC shearing equipment placed in operation in a Cleveland plant has enabled it to step up its production of 70 x 90 inch sheets cut from coils of 20-gage steel by 33 per cent. At Chesterfield Steel Service Co., a Steelweld shear in operation for about 20 months has cut about 30,000 tons of sheet steel. In one two-and-a-half month period 7000 tons alone went through this automatic operation.

Blades for the shear, made by Cleveland Crane & Engineering Co., Wickliffe, O., are changed after the cutting of every 5000 tons. With each blade having four cutting edges, a total of 20,000 tons of steel for auto bodies and other parts may be cut before the knife must be resharpened.

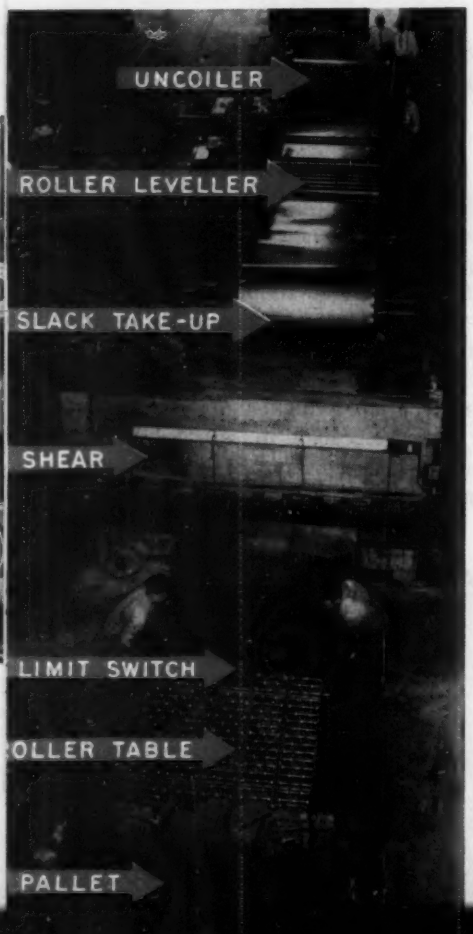
Crane Places Coil—The first step in the operation of this automatic shearing arrangement is placing the coil of sheet steel in the uncoiler by an overhead crane. This two-man operation takes about 8 minutes.

Coils from 24 to 79 inches in width and of 20-gage steel may be handled by the uncoiler. As the coils unroll and go through a roller-leveller to straighten the steel, they progress on to a conveyor which carries the steel through the back of the shear.

Full control of the uncoiler and the conveyor at all times is given to one man operating a controller situated at the side of the roller-leveller. If necessary, he can reverse the steel strip on the conveyor or rewind it on the uncoiler, thus eliminating the problem of jamming.

Switch Controls Cut—As the steel comes through the front of the shear and on to a roller-table, an automatic limit switch in the center of the table controls the cut and the desired length of the piece to be sheared. Two men move the cut sheets down the roller conveyor onto floor pallets, after which they are bound, 340 pieces to the bundle, and loaded by overhead crane onto a waiting truck. Because it is controlled electrically, the pivoted-blade shear is easily adapted to automatic shearing operation. The ease with which knife clearance may be changed to suit various gage materials within the capacity of the machine also adapts it to the automatic sequence.

With heavier or lighter metal to be cut, the gap between the knives is decreased or increased to the proper amount by turning a conveniently located hand crank at the right side of the machine and watching an indicator which shows the clearance in thousandths of an inch.



Bird's eye view of the automatic shearing line. Steel moves from background to foreground

DEVELOPMENT OF IMPROVED METALS

• • • to determine success of atomic energy program

Strength of metals, diffusion in solid metals, thermodynamic research, corrosion and the effects of radiation are among AEC's basic research projects reported here. Developments are of fundamental interest

METALLURGY is a field of vital import in the atomic energy program. Particularly in reactor development, intensive research has been necessary to perfect metals and alloys of metals that can perform adequately under the temperatures, pressures and radiation to which they are exposed. Success of development at nearly every point depends on improvements in available metals.

The Atomic Energy Commission's program in metallurgical research is necessarily aimed at urgent practical goals, involving strength of metals, diffusion in solid metals, thermodynamic research, corrosion and effects of radiation.

Strength of Metals — Strength and plasticity of metals are related in a complex way both to the atomic lattice binding and the more gross characteristics of grain or crystallite structure. In theory, metallic structure should provide considerably greater strength than is actually the case. Many attempts have been made to explain this discrepancy, but the answer is still not clear. Currently the most acceptable explanation is that actual strength is less than theory indicates because of imperfections known as dislocations believed to be present within the metal lattice.

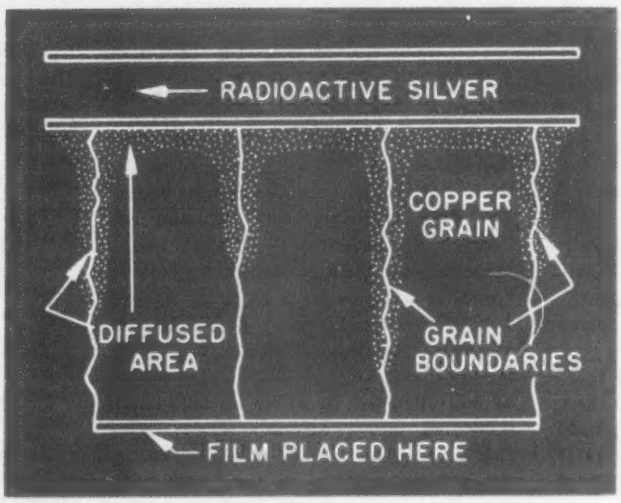


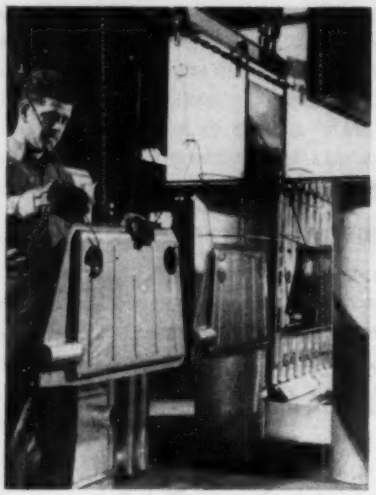
Diagram showing method of studying diffusion of silver through copper

A group under AEC sponsorship at the University of California is attacking this problem by controlled experiments on "creep" of high purity nickel. The term "creep" signifies very slow extension or stretching of a metal under stress at elevated temperatures.

To measure this property, a carefully machined specimen is suspended vertically in a furnace and subjected to a load tending to stretch it. The actual total stretch may only be a few thousandths of an inch, and measurements are usually made to an accuracy of at least one ten-thousandth of an inch. The commonest method of measurement is by sighting inside the furnace with an optical telescope and measuring and comparing the motion of two reference points on the specimen. Furnace temperatures must not vary more than one-half of one degree from the control point, since temperature fluctuation strongly affects creep rates. Creep rates also depend on metal grain size, the prior heat treatment of the specimens, the rate of hardening produced by the stretching, and other factors.

Creep occurs generally in three stages, all of which are accelerated by high temperatures and heavy loads: a) Rapid stretching or elongation which continues for a short time (minutes or hours). b) A slow, steady extension which may continue for years. c) Finally, a rapidly increasing rate of stretching until failure occurs. The mechanism by which creep occurs is still a subject of controversy. Creep occurs in single crystals and also in material made up of many crystals or grains. Theories of dislocations (specific lattice discontinuities), theories concerning so-called viscous flow at grain boundaries, and theories involving a subcrystalline unit labelled a "mosaic block" are all prevalent today. It is hoped that data resulting from this work will aid in developing a more satisfactory theory of plastic flow in metals. This is potentially of great importance to the nuclear reactor engineer.

Diffusion In Solid Metals—A fundamental fact in metallurgy, perhaps hard to visualize, is that considerable movement of atoms is possible within a metal lattice. Some of the most important properties of metals, such as grain growth, recrystallization, and age-hardening are affected by this through-the-lattice



DEGREASING WITH HEAT: Two banks of nine vertically mounted 3.6 kw Chromalox radiant heaters effectively degrease 20 x 31-inch sheet metal parts at Lawson Mfg. Co., Pittsburgh. A continuous conveyor carries the parts for floor furnaces through the infrared oven which in itself requires little space. So thorough is the degreasing that no trace of oil is said to remain after the 36-second trip through the oven. Each bank of heaters, made by Edwin L. Wiegand Co. of Pittsburgh, has a unit mounted at a 45-degree angle to increase the temperature at the bottom edge of the work

movement of atoms known as *diffusion*. For example, if a smooth flat block of copper is placed on a similar smooth flat block of silver, and the pair are heated to a fairly high temperature but still below the metals' melting points, silver atoms will move into the copper block and copper atoms into the silver block. And this net interchange, or diffusion, of silver and copper atoms bonds the metal blocks solidly together. This technique, actually used to fasten metals together, is known as diffusion bonding or diffusion welding. Heat is necessary since the rate of diffusion of atoms is greatly accelerated by increasing temperatures.

If two similarly prepared blocks of copper are placed together and heated, similar bonding occurs. This indicates that copper atoms move across the interface (boundary) between the blocks to form atomic linkages and hold the blocks together. This movement of atoms in a single metal is known as *self-diffusion*. It explains why strong, coherent metal bodies can be formed by powder metallurgy processes in which finely powdered metals are first compressed under high pressures and then heated to high temperatures for "sintering." In sintering, metal atoms simply diffuse across the compacted particle boundaries and establish a continuous solid body. In none of these operations is the melting point of the material ever reached, and all bonding reactions occur between solid particles.

Hardening of steel takes place largely because of a change in the organization of the iron lattice as the metal is cooled from high temperatures. This so-called phase change is made possible by the diffusion of atoms to new sites in the lattice. The hardening process in steel is a key industrial phenomenon, and much of our present knowledge of diffusion grew out of extensive research in steel technology. The mechanism by which diffusion occurs is not yet fully understood. Three different AEC-sponsored projects are now working on this problem.

Relative Diffusion Rates—At General Electric Co.'s research laboratory, studies are under way to determine the relative rates of diffusion at metal surfaces, through grain boundaries, and through the grains themselves. Certain information on the rates of diffusion along these three paths was gained some 20 years ago, but only for the diffusion of thorium in tungsten. At that time, metallurgists lacked certain high precision techniques such as radioisotope tracer methods, which now can be used to advantage. The General Electric group is now measuring the rates of self-diffusion in silver by using radioactive silver atoms. They have found that the rate of diffusion along grain boundaries is at least one million times greater than through the grains themselves. Since a metal sample with many fine grains has far more grain boundary area than one with fewer, larger grains, the total rate of diffusion may therefore be expected to be faster in a fine-grained sample than in a coarse-grained one.

Self-Diffusion Rates—The research laboratory of Sylvania Electric Products Co. at Bayside, N. Y., is also studying diffusion phenomena as part of its fundamental program supported by the commission. This group has developed a new method for measuring the rate of self-diffusion of atoms. Certain metals do not have suitable radioactive isotopes to use in measuring self-diffusion rates. In the Sylvania method a fine wire, of copper, for example, is placed on a copper block and the two pieces are heated to a temperature at which diffusion, and therefore bonding, occurs.

As diffusion occurs, a neck is formed at the junction of the wire and the block. By measuring the thickness of this neck after various heating times, the rate of diffusion can be calculated.

Effect of Grain Orientation—Carnegie Institute of Technology, also working on diffusion at grain boundaries, is trying to determine whether the orientation of adjoining grains has any effect on the rate of diffusion at the boundary between the grains. The experimental technique is to measure the rate of diffusion of silver atoms into the boundary regions between large column-like grains of copper in which the exact orientation in space of the lattice pattern has been measured.

Several methods are being used to trace the course of diffusion. In one method, a thin layer of a radioactive silver isotope is electroplated directly on one surface of a cast piece of copper prepared in the form of foil 0.005-inch thick. The plated specimen is then heated to a temperature at which diffusion will occur. When the specimen has cooled, a photographic film is placed against the unplated side of the specimen. As is shown in the accompanying diagram, radioactive silver will penetrate down the columnar grain boundary and will be closer to the film at these regions. The film, exposed to the radiations from the radioactive silver, will be darkest where the silver is closest to the film. The relative amount of diffusion at the grain boundaries and through the grains can thus be measured.

Heat-Energy Approach — Stepping almost directly into the chemist's field, metallurgists have recently begun more extensive use of the so-called thermodynamic approach to find answers to unsolved fundamental problems. In this approach, attention is focussed on the varying heat-energy content of metals under different conditions. For example, heating a 1-pound sample of iron up to its melting point (about 2800° F) from room temperature (say 70° F), requires about 86,000 calories of heat energy. At this point, to melt the iron, without any further change in temperature, requires nearly 30,000 calories. Melting is called a "change in state." Other changes in state are known—vaporizing, condensing, solidification—and each one requires a transfer of heat energy.

This change in heat energy works

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in both directions. In some changes of state heat energy is given off. When steam condenses into liquid water, a large amount of heat is liberated—268,000 calories per pound—and this takes place at 212° F without any change in temperature. Similarly, heat energy must be taken from water at the freezing point to change water to ice.

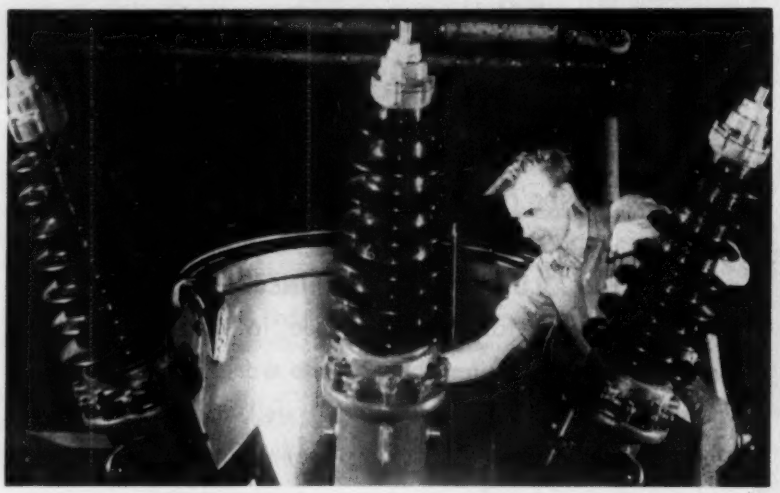
Chemists have known for a long time that heat-energy changes go along with chemical reactions. And the chemical reactions that occur in processes of refining and alloying metals are no exception. This is the point where the metallurgist borrows techniques from the chemist. Reactions which occur in liquid alloys or liquid metallic solutions can be studied by methods similar to those which the chemist has used for many years in studying solutions in water and other liquids at lower temperatures. While the same thermodynamic principles apply to liquid metallic solutions, experimental methods must be developed to meet the problems imposed by higher temperatures.

Three Attacks on the Problem—At Massachusetts Institute of Technology, three different methods of attack are being directed at this general problem. One method (also being used at Carnegie Institute of Technology) involves the measurement of electromotive force in an electrolytic cell. One might say that this means measuring voltages in a series of batteries, the elements of which instead of being those of a normal storage battery (lead, lead oxide, and sulphuric acid solution) are the liquid metals or alloys to be studied and a mixture of fused melted salts. The techniques in use at MIT have been extended to study three-metal systems such as cadmium-lead-tin, cadmium-lead-bismuth, and cadmium-lead-antimony. Previous studies have been largely limited to two-component systems.

A second method involves measuring the vapor pressures of metals over their liquid alloys. Here alloys of cadmium and zinc are being studied.

The third approach, which uses liquid alloys of iron and sulphur, utilizes the reaction of sulphur with hydrogen to produce hydrogen sulphide (H_2S).

Heat-of-Formation Studies—At the University of Pittsburgh, work is concentrated primarily on developing methods and designing and building equipment for studying various heat-energy transfers involved in metallic alloy formation. A special calorimeter has been built to determine the heats of formation of magnesium-cadmium alloys and sodium-potassium alloys. Other special equipment is virtually complete for measuring low temperature heat-of-formation effects of magnesium-cadium alloys. In connection with this work, facilities for experimenting at the extreme cold of liquid helium (approximately 4° C above absolute zero, or −452° F) had to be provided.



HOW TO PUT VOLTS ON WHEELS: Mounted on a semitrailer and drawn by a tractor type truck is a 22-ton transformer made by General Electric Co., Pittsfield, Mass., works for Central Vermont Public Service Corp. The transformer, huge bushings of which are shown, is capable of traveling at 40 mph to an area where electric service has been interrupted by damage to a transformer. This mobile unit is said to make possible the restoration of normal service within as little time as 10 minutes after arrival

Metallurgy of Solids—The thermodynamic approach may also be applied to metallurgy of solids. A research group at General Electric is working on measurements of the energies contained in metallic grain boundaries. For the first time, the energies required to form a boundary between two crystals of the same metal have been measured. This quality determines in part the rate at which these boundaries move when grains grow under the influence of high temperatures and, combined with the diffusion data previously discussed, should contribute much to our understanding both of metal surfaces and of the boundary interfaces between metals.

Scientists at MIT are using somewhat different techniques to attack this same problem. Their objective is to measure the degree of order, that is, the regularity, in the metal lattice at the grain boundaries.

X-Ray Studies—Question of order or degree of lattice perfection is also being studied at Carnegie Institute of Technology by advanced x-ray methods. The research programs at MIT and the Carnegie Institute of Technology are examples of the growing use of x-rays in studying the atomic structure of metals. If we recall that normal sunlight can be separated into its spectrum of wave lengths by means of finely-ruled gratings, it is somewhat easier to understand the use of x-rays in crystal structure work. Here the lattice planes in the crystal take the place of the grating lines and reflect the x-rays. The angles of reflection depend on such things as lattice spacing and regularity. In a typical experimental setup, a beam of x-rays strikes a crystal at a known angle. Within the crystal, the rays are reflected (at the same angle) onto a photographic film. X-ray pictures on film can then be interpreted to reveal information of the atom arrangement of the crystals through which the x-rays pass.

Research on Corrosion—Corrosion is a general problem in use of metals. Its severity varies with the environment to which the metals are exposed. Since corrosion is generally accentuated by high temperatures, it is of prime concern to atomic energy metallurgists.

Two paths of solution are open. The first approach is through specific experiments on one material under a specific set of conditions. This type of development research is needed to obtain quick answers to the most pressing problems. But then, more frequently than not, if conditions are altered slightly, these answers no longer apply, and the work

must be repeated. The second, more fundamental approach is through a long-range research program which will reveal the basic nature and underlying causes of corrosion in metals. The principles thus learned can then be applied to the specific problems at hand.

Since the Office of Naval Research already has under way a well organized, comprehensive program on corrosion fundamentals, AEC has not entered into extensive work in this field but has tried to select limited areas which appear most relevant to direct corrosion problems of the atomic energy program.

Certain types of corrosion are accompanied by a flow of electric current and are characterized by voltages known as "electrode potentials" which exist between metals placed in current-carrying solutions. For instance, if a number of metal strips such as copper, silver, nickel, and zinc are immersed in a salt solution, a voltmeter put in contact with any two dissimilar strips, a voltage will be shown on the voltmeter. These electrode potentials vary with the metals and solutions involved, the temperature, and other factors.

Corrosion of Zinc—The work now being done at Carnegie Institute of Technology on the corrosion of zinc is a good illustration of the need for complete understanding of this corrosion process. Historically, coatings of zinc on steel, commonly called galvanized steel, have been used for many years to minimize the reaction of the steel with water and prevent the formation of rust. The traditional explanation for the protective action of the zinc is that zinc, being more active chemically than steel, has a greater tendency to go into solution; hence, the steel is protected at the expense of sacrifice of the zinc coating.

Common use of galvanized articles over many years might lead one to believe that the corrosion behavior of zinc had been accurately evaluated. However, only recently it has been noticed that galvanized steel when exposed at high temperatures to certain types of water, as in water heaters, is no longer protected by the zinc coating. Under these special conditions, the zinc coating appears to have lower activity than steel and it is the steel that corrodes. Full-scale basic investigations of this type of phenomenon will give information which will lead to a more complete understanding not only of the corrosion characteristics of zinc but also of the corrosion process in general.

Along with the work in zinc, the corrosion characteristics of titanium metal are also being evaluated. Titanium metal is the basis of an intensive industrial development at the present time, because its solutions or alloys with other metals have high strength and light weight. The future uses of titanium and titanium alloys depend on better understanding of their reactions with water or water solutions. The present study will furnish such information and also assist in developing a general theory of corrosion.

Effect of Radiation on Metals—Another topic of major concern to the commission's materials engineers is the effect of radiation on metals. Again a double-barrelled approach is being taken to obtain answers to the problems.

In the first, samples of many different materials are being put into operating reactors to determine the effects of radiation on their hardness, electrical resistance, dimensions, strength, and other properties. This empirical cut-and-try approach is being supplemented by basic investigations into how radiations induce changes. Part of this basic work is being done in universities and other co-operating institutions by the use of cyclotrons or other nuclear particle accelerators to irradiate metal samples.

Atom Displacement—Since the displacement of atoms or distortions of the atomic lattice are the basis for many property changes in metals, radiations which cause such displacements can be used to investigate metal structure. For example, when a neutron from a reactor penetrates a metal lattice it may strike the nucleus of one of the metal atoms and displace this atom from its normal position. The lattice is thus distorted. When many thousands of neutrons per second enter a small area of metal, considerable disruption of the lattice is possible. In some cases the displaced atoms may lodge in between normally located atoms and create high stresses. This will show up in greater hardness, less heat conductivity, less ductility, and perhaps even in changes in size of the material affected. Similar changes are produced in metals by such operations as rolling or hammering at low temperature, and it may be possible to establish a relationship between neutron-induced changes and those produced by mechanical effects.

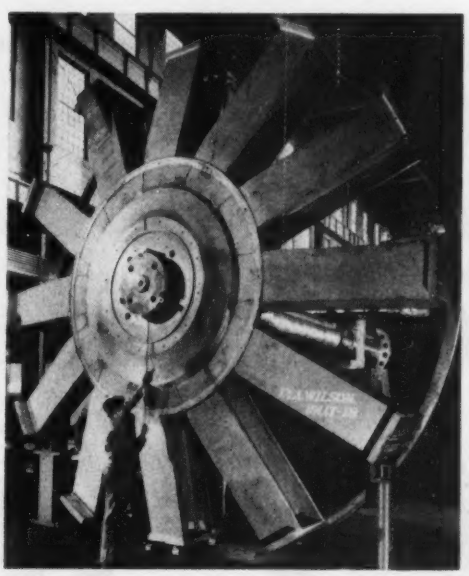
Numerous other miscellaneous topics of fundamental interest to metallurgists are being studied under AEC auspices. Studies in heat transfer to molten metals, methods of measuring heat conductivities in ceramics, and studies in mineral engineering involving radioactive tracers are examples.

From data presented in the seventh semi-annual report of the Atomic Energy Commission, January, 1950.

Safety & Hydrogen Sulphide

INFORMATION essential to the safe handling and use of hydrogen sulphide in transit, in the plant and in the laboratory is contained in chemical safety data sheet SD-36, available from Manufacturing Chemists' Association Inc., Washington 5, D. C.

The 12-page manual lists important physical and chemical properties of the chemical, describes its usual shipping containers and the methods recommended for their safe unloading, handling and emptying and storage.



GIANT SPIDER: Fitted on its shaft in the Milwaukee, Wis., shops of Allis-Chalmers Mfg. Co. is this huge rotor spider. For a 25,000 kw, 28,000 kva, 13,800 v, vertical hydroelectric generator, it will be installed in the Wilson dam of the Tennessee Valley Authority. The eighteenth and final unit for this installation, the three-phase 60 cycle generator is one of ten to be directly connected to Francis runner hydraulic turbines, each rated at 35,000 hp at 100 rpm under 92-foot head

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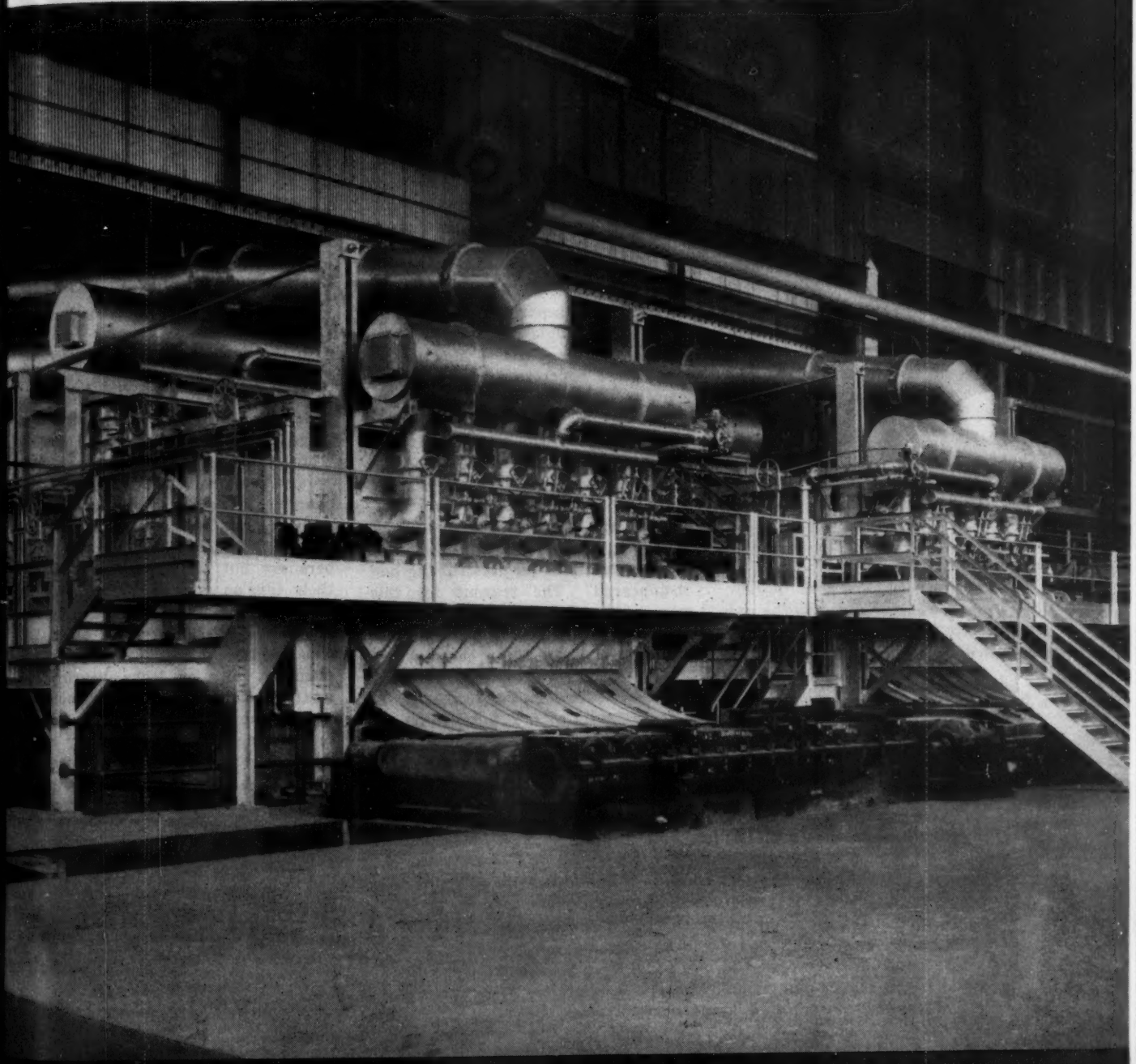

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Wire Patenting Furnaces

Galvanized Bridge Wire

. . . basic unit of Americanized prestressed concrete design

By BLAIR BIRDSALL
Assistant Chief Engineer
Bridge Division
John A. Roebling's Sons Co.
Trenton, N. J.

SUCCESSFUL development of Americanized prestressed concrete as a construction material is due in large degree to experimental work John A. Roebling's Sons Co. has been conducting since 1944. Roebling engineers are impressed with the appearance and economy of the material whose excellent engineering properties are imparted by wire or wire rope.

Reduced to its essentials, a prestressed concrete structure is made up of concrete members which have been so designed and constructed that bending and direct stresses do not become tensile under design working loads. This applies to both dead and live load stresses. It can only be accomplished by placing the members in compression initially.

The desired pressure can be applied in a practical manner by the use of reinforcing steel placed parallel to and either through or alongside the concrete member and anchored to it. This steel, if placed in initial tension, will produce the desired compression in the concrete. A prestressed concrete beam need not be made up of a single homogeneous concrete member. Several precast pieces can be placed together. When prestressing is applied the separate pieces act together as a single beam.

Idea Not New—Basic idea behind prestressed concrete is not new. It was recorded as early as 1886. The very early attempts met with little success due to the poor quality of concrete. Attempts during the first two decades of the twentieth century failed for another reason. Prestressing was applied with mild steel. Not very long after completion of a beam it was found that all prestressing had disappeared. The reasons for this were recognized early in the 1920's. Shrinkage and plastic flow of the concrete plus, in some cases, creep of the reinforcing steel, caused an effective reduction in length equal to the total elastic stretch produced in the mild steel by its relatively low allowable working stress. It was at this time, therefore, that the necessity of using high strength steel was recognized.

This led to the adoption of cold drawn steel wire as the most satisfactory prestressing medium. The material could be stressed six or seven times as high as mild steel with the result that only a small portion of the prestress was lost due to plastic strains.

During the 20's and 30's prestressing techniques were developed in many parts of Europe. The principles have been used in the United States for some years on pipes and tanks and are now being applied to other types of structures.

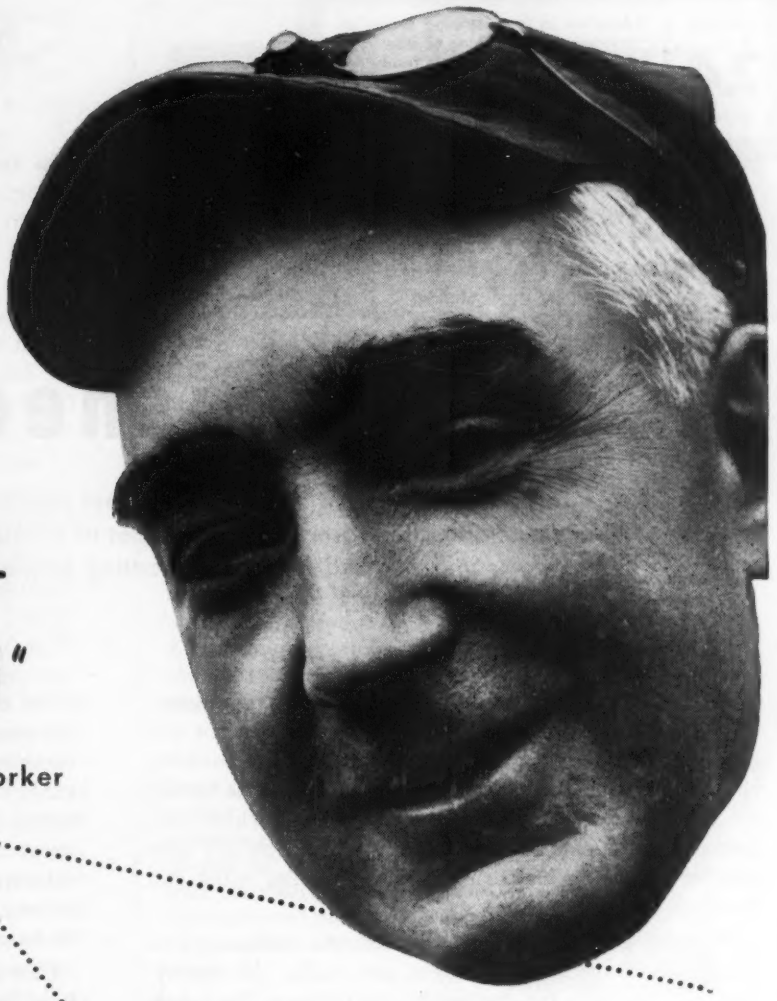
In Europe, many types of reinforcing have been used. They fall into two general categories—bonded and unbonded. Bonded reinforcing is placed under tension before the concrete is poured, using external temporary anchors to take the pull. The concrete is poured in direct contact with the reinforcing. After the concrete has set, the reinforcing members are cut, and the force due to their tension is transferred into the concrete by bond. Unbonded reinforcing is not tensioned until after the concrete has set, and tension is applied by nuts or jacks bearing directly against the concrete member. The reinforcing may be in place during pouring, but surrounded by bond-preventing tubes. In other cases, the reinforcing may be placed after pouring by threading it through recesses left in the concrete.

Bonded reinforcing has the disadvantages that external anchors are required and that the prestressing load is reduced by the lastic shortening of the concrete, as well as by plastic deformations. It has the ad-

(*Please turn to Page* 115)

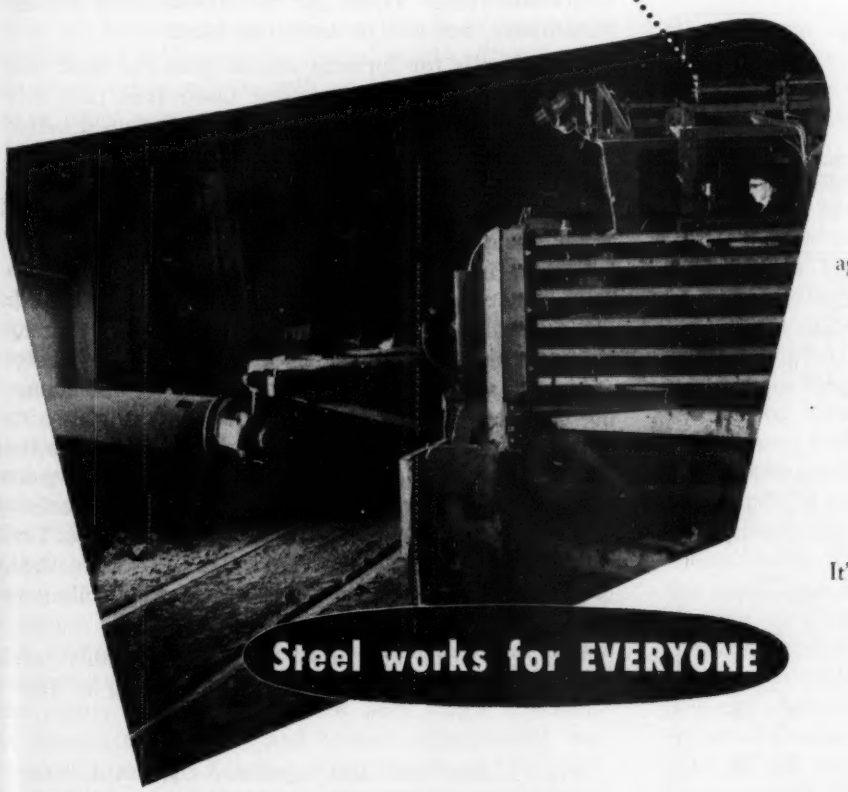
Fig. 1—(left)—Underside of a one-tenth scale model of a 200-foot highway bridge. Sides and top are 1½ inches thick. Note arrangement of parabolic cables which pass under saddles supported by ribs of varying depths, gradually increasing toward midspan. Model was made up of five precast sections

Fig. 2—(right)—Three-inch thick jointless prestressed section of floor of the Roebling warehouse in Chicago. Prestressed area is approximately 100 x 150 feet. Prestressing members consist of two layers of galvanized bridge wires, 4½-inches on centers in one direction and one layer of 9/16-inch diameter galvanized bridge strand 14 inches on centers in the other direction. This view shows the jacking arrangement used for prestressing. Concrete was stressed to 600 psi in both directions. This slab, described as an elastic mat, remains absolutely crackless after carrying heavy concentrated loads since October, 1946



"Jobs are easier- and safer in Steel"

says Bob Anderson, steel worker



Bob knows what he's talking about. For 17 years he has been a charging machine operator in an eastern steel plant.

His job is to feed the limestone, scrap and ore into an open hearth furnace. Years ago, men shoveled in the materials by hand. Today Bob handles the whole job by finger tip, standing behind a big control panel.

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By KARL L. FETTERS
Special Metallurgical Engineer
and
H. H. HOTTEL
Metallurgical Engineer
The Youngstown Sheet & Tube Co.
Youngstown

PRODUCTION OF

Semifinished Steel

The authors discuss the heating of steel ingots prior to their being rolled into semifinished forms. Various types of soaking pit furnaces in use today, fuels utilized, and method of heating employed are herein described

PART I

LARGEST producing rolling mills in the steel industry in terms of yearly rolled tonnage are not the great high speed continuous sheet strip mills with their many motors and controls, but the mills which do not deliver a finished product, those which roll down massive steel ingots quickly and efficiently into smaller semifinished forms which finishing mills can handle.

Primary group of steel mill products designated as semifinished are blooms, billets, and slabs. No invariable rule prevails for distinguishing between the terms billets and blooms. Generally speaking, both are approximately round cornered squares or rectangular in cross-section with billets being smaller in cross-section. Custom varies, but about 4 x 4 inches is the largest section usually spoken of as a billet, whereas larger sections are referred to as blooms. Slabs are rectangular in section and usually in excess of 2 x 8 inches. In general a slab is wider and flatter than a bloom or billet and rarely as thick as a bloom.

This discussion deals with the steel ingot from the time it is taken from the mold until it is delivered to a finishing mill as a slab, billet, bloom, or as skelp or large wire rods. These last two terms were not defined above, but will be described later.

Use of rolls for forming metals goes far back into antiquity. Somewhere someone discovered that soft metals such as gold and lead could be flattened better and faster between a pair of rolls than by beating with a hammer. The earliest record of a mill for this purpose was found in a sketch made by Leonardo da Vinci about 1495. Hand mills for rolling sheets of lead were in existence in 1615 and during 1715 mills driven by waterwheels or horses were installed for rolling lead and copper. It is also recorded that by 1553 a Frenchman had made a mill for rolling sheets of gold or silver to a uniform thickness for the stamping of coins. Prior to 1751 rolls were used in Sweden to produce certain steel sections and at that time the assertion was made that by rolling the material, more than twenty times as much product could be made in a given time as with the tilt hammer then in use. This fact coupled with the efficiency of the rolling method, is responsible for the universal adoption of rolling as the favored method of forming.

Wrought iron and steel were not readily cold formed and most of the early hot working of these

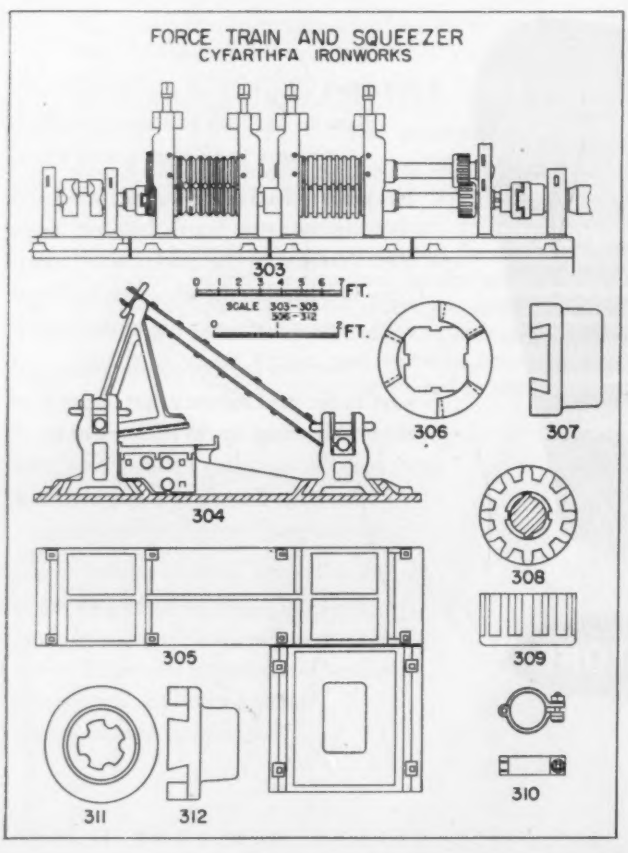


Fig. 1—Bar mill and squeezer, Cyfarthfa Iron Works about 1850. (From "The Iron Manufacture of Great Britain" by W. Ruran (1855)

metals was generally accomplished under a hammer. Development of the rolling mill for wrought iron and steel goes back to Henry Cort who in England during 1783 used a mill with plain grooved rolls for rolling wrought iron.

From the days of Cort to the present time, the rolling mill has kept pace with the growth in production and has passed through a rapid process of development not only in size and power, but also in design and in the shapes of the rolled sections.

Soon after the first mills for rolling blooms of wrought iron were developed there followed bar mills, plate mills, rail mills and structural mills and as time went on wrought iron was gradually replaced by steel. At the present time more than 90 per cent of the steel products made are processed on one or more rolling mills in the course of their production. An early bar mill and squeezer in use in England prior to 1850 is shown in Fig. 1.

As the name implies, soaking pits were originally holes in the ground into which hot ingots were placed and allowed to equalize in temperature prior to rolling. As specification and quality requirements became more stringent and the many presently available alloy grades of steel were developed, it was found necessary to control rolling temperatures much more precisely than might be accomplished by soaking alone. Modern soaking pits are so constructed that they may either be used as a "soaking" pit or as a heating furnace. Until quite recently they were underground furnaces of either square or rectangular cross-section, heated by the regenerative principle, and could be opened at the top to receive four or more ingots in a vertical position. Soaking pits are usually under cover of a building adjacent to the entering side of the blooming mill and are spanned by one or more cranes capable of placing ingots into the pits from the ingot buggies and delivering the heated ingots either to the approach tables of the mill or to a transfer buggy when they are ready for rolling. In some mills stripper cranes which remove molds from ingots or ingots from molds, as the case may be, are also located over the pits, and may be used to charge ingots into the pits.

Until about twenty years ago, practically all soaking pits were square or rectangular "holes" having single or double checkers on each side which were controlled by reversing valves and used alternately to recover heat from the flue gases or to heat incoming air or air and fuel. Since many pits operated on producer gas, use of the double checker arrangement was quite popular. In these double checker pits combustion took place in the arches or ports connecting the checkers with the pit proper. When fuel oil or gases higher in calorific power than producer gas were to be burned, the usual arrangement was to place a simple "pipe" burner in the ports and use both the gas and air checkers or the air checkers alone to preheat the air. Some pits designed and built for the higher calorific fuels used only single checkers. In these pits the port and burner arrangement was about the same. A usual arrangement was to place four pits in a row having a common flue and air intake. Although valves and dampers were used it was usually quite difficult to control the combustion in a particular pit to the degree now considered necessary for the highest quality steel. Port marking of ingots —that is an overheated or burned area on the side of the ingot or ingots adjacent to the ports—was a common occurrence.

Since 1930 there have been many improvements in pit design, some differing markedly from the simple regenerative type, described above, which still accounts for almost 80 per cent of all pits presently in use. Even in today's regenerative pits improved designs, controls and practices are doing a much better job than in the old pits. It is now generally accepted that a long luminous flame is to be desired for proper heating and burners are designed so that mixing and subsequent combustion of the fuel and air occurs over a distance to produce the desired length of flame.

A modern pit of the reversing regenerative type is shown in Fig. 2. These pits are generally larger than the older type and feature a most careful balance of checker and pit volume as well as high efficiency combustion and draft control. In the type shown, combustion begins in the top of the checkers and with proper placement of the ingots uniform heating can be accomplished. With this modern type as with the older types, attempts at forced heating in order to keep up with high speed mills is a source of much surface trouble encountered in rolled steel products.

Karl L. Fetters graduated from Carnegie Institute of Technology in 1931 with a BS degree in metallurgy. Nine years later the Massachusetts Institute of Technology awarded him a degree of Doctor of Science.

During his business career he has been employed by National Tube Co. and the Youngstown Sheet & Tube Co. For a few years he was an assistant professor of metallurgy and a member of the staff of the Metals Research Laboratory of the Carnegie Institute of Technology.

He was the first recipient of the open hearth fellowship of the National Open Hearth Committee, an honorary fellow in metallurgy at MIT during 1939-1940, and received the institute medal of the American Iron and Steel Institute in 1948.

He is a member of AISI, AISE, AIME, ASTM, ASM, the Electrochemical Society, National Association of Corrosion Engineers, and the British Iron and Steel Institute.

H. H. Hottel graduated from Case Institute of Technology with a BS degree in metallurgy and has been employed in the metallurgical and claim departments of the Youngstown Sheet & Tube Co. continuously since that time.

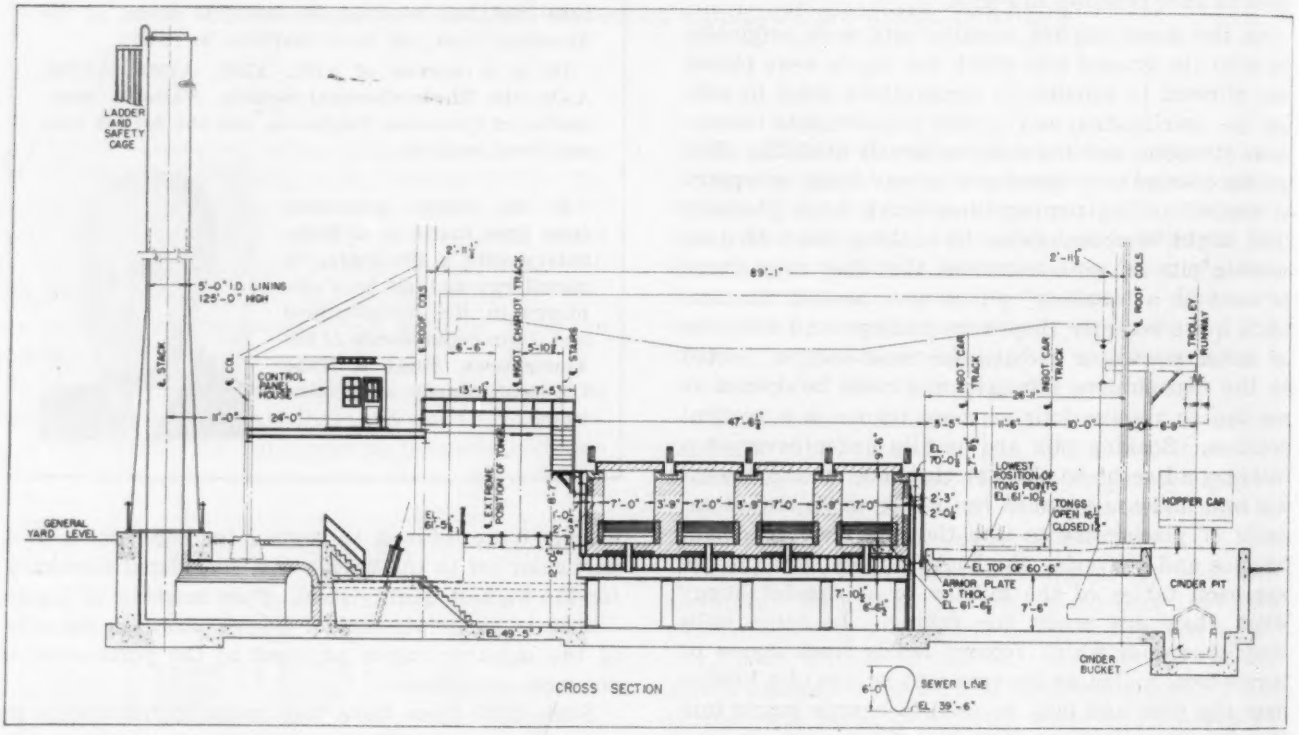
Typical modern regenerative pits are 10 feet wide, 15 feet long and 10 feet deep.

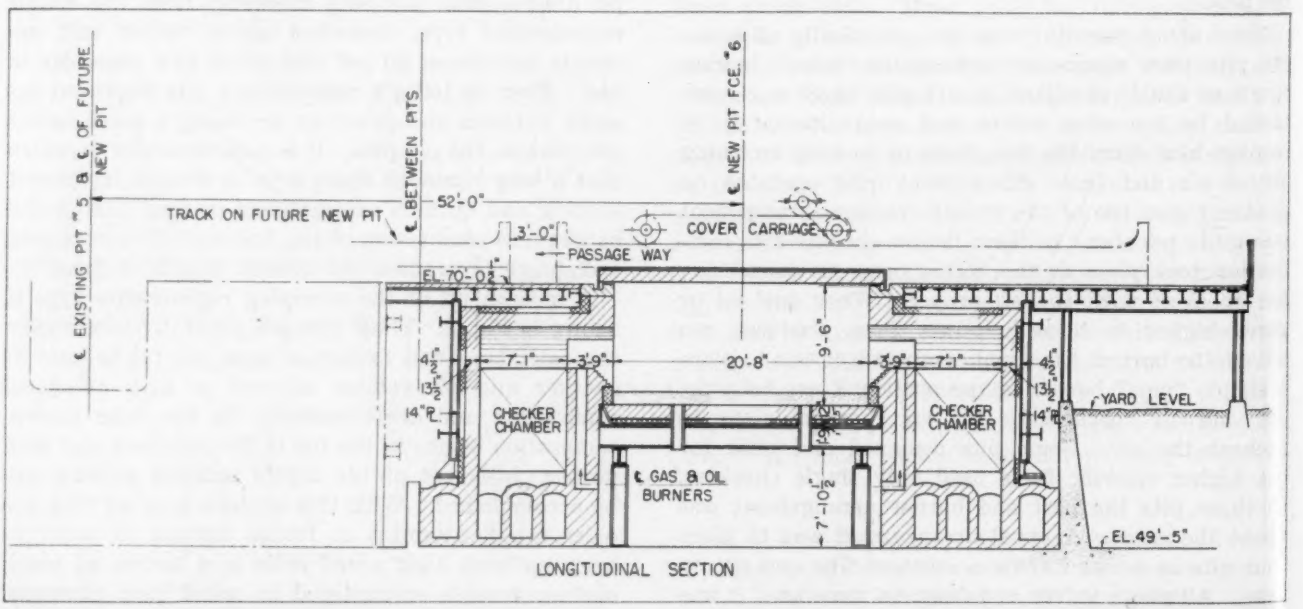
High grade fireclay brick are the usual lining material for soaking pits which are regularly required to stand temperatures of 2400 to 2500° F. Highly refractory silica brick are used around the ports and in combustion chambers while chrome brick are placed around the slag line. The pit bottom is covered with 10 to 20 inches of coke breeze which absorbs the molten oxide that runs off the ingot and aids in maintaining a reducing atmosphere in the pit during its operation. Access holes are usually located in the bottom of one or more of the walls for removal of the oxide and spent coke. Pit covers are a steel framework lined with fireclay brick. In some plants they are supported by wheels that run on tracks along the top of the pits so that they may be readily opened.

In some pits there are cranes immediately over the top of the pits to pick up the covers and move them back to permit easy charging and drawing of ingots. Fig. 3 shows a row of four pits with the covers open. In this picture may be seen an overhead charging crane and the valves and dampers used to control firing and reversal of the checkers.

In recent years there have been a host of developments in soaking pit design with many innovations being built around recuperators. Today's pits may be of the "one-way" or "two-way" fired type. Principal aim has been toward improved heating of the steel with less likelihood of "burning". For the most part these pits have been intended for use with fairly

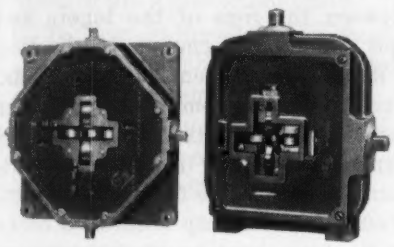
Fig. 2—Longitudinal and cross-section view of a modern 4-hole reversing regenerative soaking pit. Courtesy Rust Furnace Co.





METAL FORMING NEWS

Turks Heads Do Away With Costly Delivery Delays



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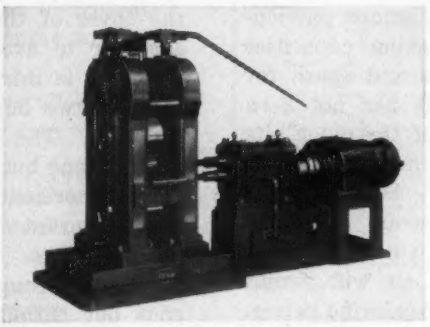
Precision Four-High Heavy Duty Mills Finish Sheets Accurately To A Thin Gauge



FENN FOUR-HIGH HEAVY DUTY MILL above has work rolls 5⅜″ diameter and backing rolls 14″ diameter.

The Fenn Four-High Heavy Duty Mills win considerable comment for outstanding efficiency wherever they are operated. These mills are used largely in finishing sheets of all types of alloys, ferrous, and non-ferrous.

The secret of their outstanding performance is the small diameter of the two working rolls and the extreme accuracy which our craftsmen build into the mills. Because of the small diameter work roll, a larger reduction can be made per pass with less work hardening. The heavy backing rolls together with Fenn's precision workmanship insure accurate gauges and extremely small tolerances. Working roll sizes range from 1½″ diameter and 3″ face width to 7″ diameter and 16″ face width.

A convenient feature of these mills is that they can be arranged either in tandem or as a single stand. Where the type of operation cannot economically permit the use of tandem mills, a reversing drive will allow a single mill to do the job and is a welcome plus. These mills can be furnished with single handwheel manual screwdown or electrical screwdown for roll adjustments.

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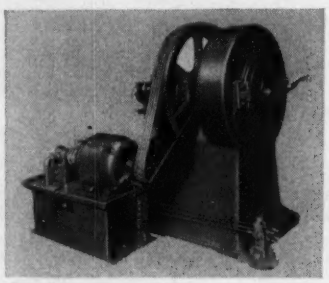
See how swaging improves physical characteristics of metal — permits improved grain structure, tensile strength, elasticity. A 16 mm. 26-minute sound motion picture is available free on request. For film, just write The Fenn Manufacturing Company direct.



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A patented hydraulic principle of wedge opening of dies is the secret back of the unique Fenn Hydro-Former performance which permits swaging at any cross section of the piece.

Ball type fittings that cannot be swaged on ordinary rotary swagers can now be swaged on this remarkable machine. In one operation, the Fenn Hydro-Former connects tubings or cables to solid fittings with joints equivalent to welds or rivets in strength. Comes in three sizes.

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Advertisement

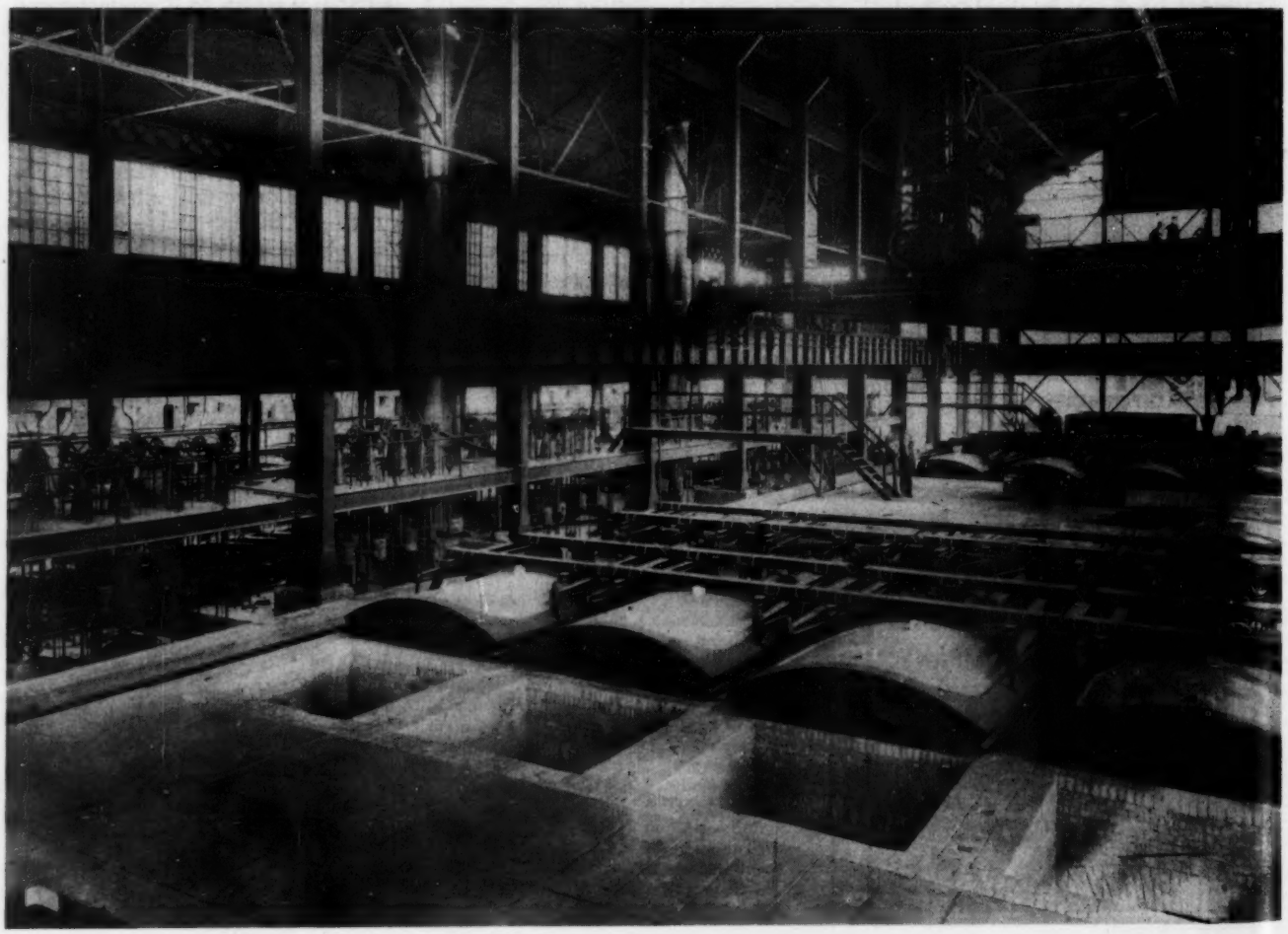
rich fuels. One of the first departures from the reversing regenerative pit was the designing of a one-way fired recuperative rectangular pit having burners located at one end near the top. The flames pass over the ingot tops, make a U-turn while passing through the charge of ingots and leave through ports located at the bottom of the same end wall in which the burners are located.

Another popular one-way fired pit is the bottom fired pit, a sketch of which is shown in Fig. 4. Due to the close-coupled arrangement of the pit proper and the recuperators, high efficiencies have been realized. There have been many installations particularily in older plants where steelmaking capacities have exceeded soaking pit capacities and space for adding conventional regenerative pits has not been available. In some cases a portion of the older pits have been replaced with these bottom fired pits whose increased capacity and efficiency have helped relieve production bottlenecks. Either gaseous or liquid fuels may be used with these pits, as it is claimed the high temperature of the combustion air will permit the use of even cold gas fuels of lower calorific values. In operation the ingots are arranged on the hearth as nearly equidistant from the center as practicable and form a large combustion chamber which permits high rates of firing without injury to the steel's surface. A simple type of burner is used to introduce fuels into the combustion chamber through the firing port located in the center of the hearth. Flame parallels the ingot's long axis and thus does not impinge on its surface to cause burning. Products of combustion after striking the covers descend to the recuperators thus heating the pit walls and the backs of the ingots by convection.

A two-way fired recuperative pit of the type shown in Fig. 5 is also available to industry. In this pit the ingots are arranged on the hearth in the usual pattern as indicated in the plan view. Pit depth allows sufficient space between the tops of the ingots and the cover of the pit for a large enough combustion chamber to avoid flame impingement on the ingots. The fuel is introduced into the combustion chamber through two burners located near the tops of the pit endwalls. The burners are placed in the same horizontal plane but pointed so that the flames are directed in a horizontal offset relationship with each other which prevents localized overheating of either ingots or pit covers. The hot products of combustion are dispersed through the pit around the ingots and then pass out through multiple waste gas ports located along the bottoms of the end walls, then directly down through the recuperator's vertical refractory tubes and on to the stack.

Sectional and plan view of a nonreversing tangentially fired circular soaking pit is shown in Fig. 6. These pits are fired through premixing or nozzle mixing burners firing at an angle with the radius. Charged

Fig. 3—View of typical plant arrangement of regenerative soaking pits



ingots are arranged in proper spacing around the center or waste gas port. The waste gases pass around and between the charge and go through this center port to the stack. Recuperators have generally not been used with this type of pit as it is believed that with very exact fuel air ratio proportioning, loss of the waste gas heat has been offset.

There are, of course, many other variations in pit design along the general lines and of the several types described above. The overall aims of modern pit designs are summarized below:

1—To heat uniformly throughout the individual ingots and among the several ingots in the pits at the same time.

2—To heat the ingots to a closely controlled temperature for optimum quality and rate of production in rolling.

3—To heat the ingots rapidly and without burning to enable their rolling without mill delays and at the maximum rate of production of the steelworks.

4—To reduce the fuel consumption per ton of ingots heated.

5—To minimize delays and costs of pit and pit bottom maintenance.

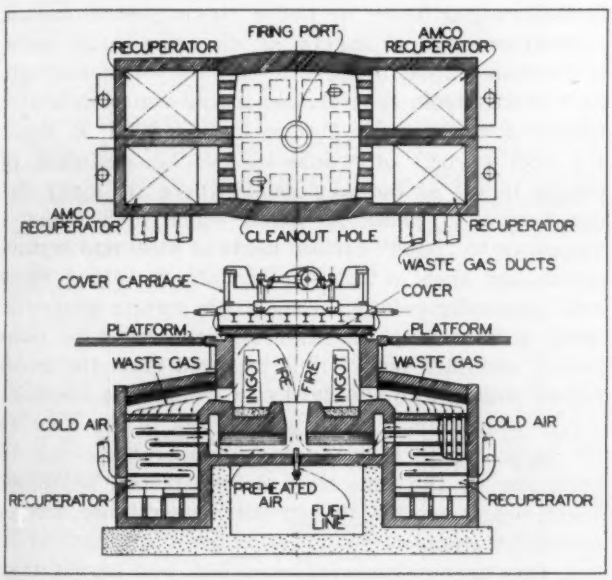


Fig. 4—Bottom fired recuperative soaking pit. Courtesy Amsler Morton Corp.

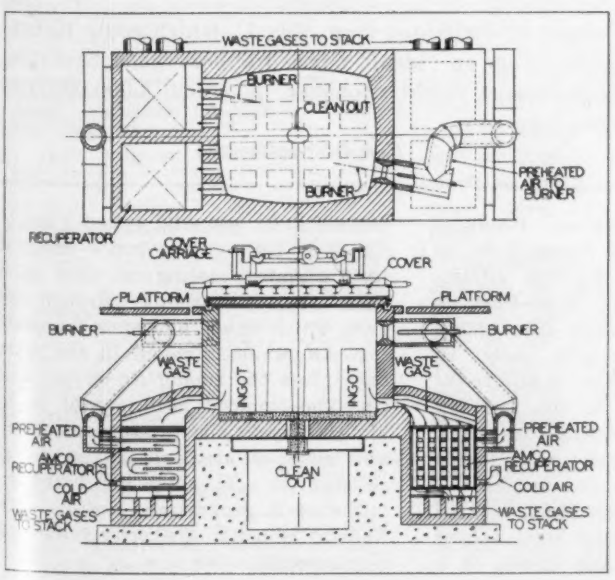


Fig. 5—Two-way fired recuperative soaking pit. Courtesy Amsler Morton Corp.

REPRINTS AVAILABLE

REPRINTS of previous individual chapters in the series "Fundamentals of Steelmaking" now may be obtained by addressing Readers' Service Department, STEEL, 1213 W. Third St., Cleveland 13, O. Prices range from 20 to 75 cents per reprint. Subjects covered in previous issues include:

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Previously various fuels for heating ingots have been mentioned. Originally many pits were fired with producer gas having a calorific power of about 250 Btu per cu ft. It was quite usual to preheat the gas as well as the air in the older regenerative pits. Many modern pits use 650 Btu coke oven gas or "mixed" gas having about 500 Btu. Many pits are also heated with oil and some with natural gas. There has been considerable favor shown in recent years to the use of blast furnace gas of 90 Btu; some recent regenerative pits have been designed with very large checker chambers to allow for its efficient use at high rates of production. For the most part use of producer gas has given way to the other fuels in modern plants. There were many difficulties with control of producer gas combustion and it was a usual sight in years gone by to see dense clouds of smoke issue from the stacks over the weekend when the flues were "burned out" after seven days of producer gas operation.

Combustion and temperature controls have contributed much to modern efficient soaking pit operation and this subject alone would require many pages for complete discussion.

Fuel consumption, time, and rate of heating in soaking pits can not be generalized. Grade of steel being heated largely determines the maximum rate of heating in any particular type of pit. Many plain carbon steels may be heated at the maximum rate possible whereas certain alloy grades must be heated very slowly. Temperature of the steel ingots at the time they are charged into the pits also determines the rate at which they must be heated. When cold

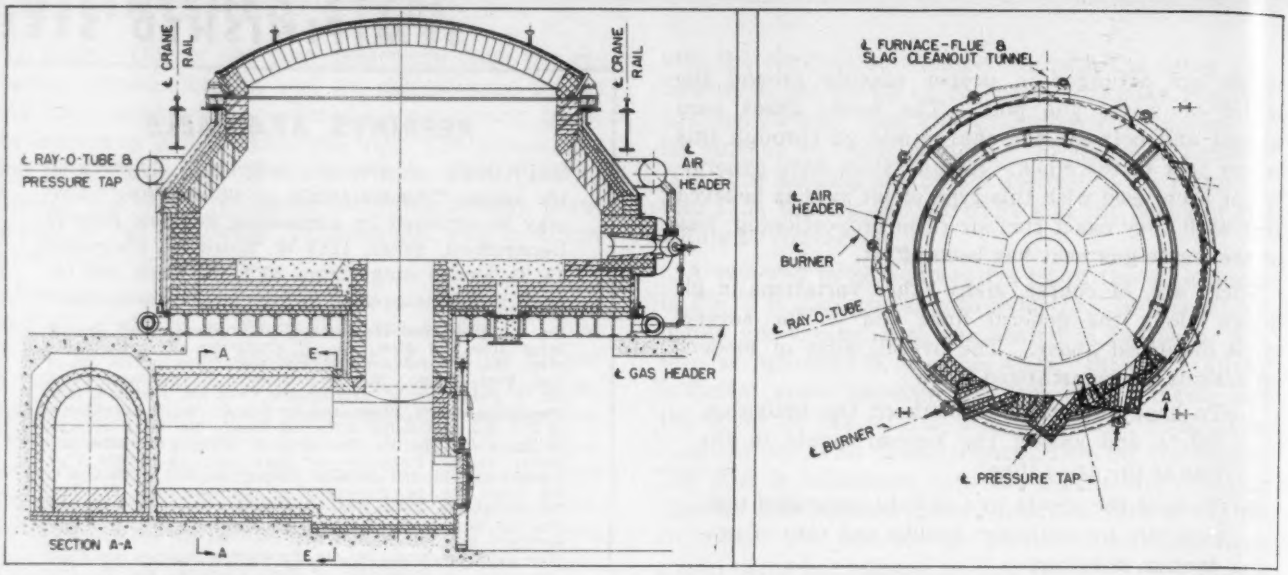


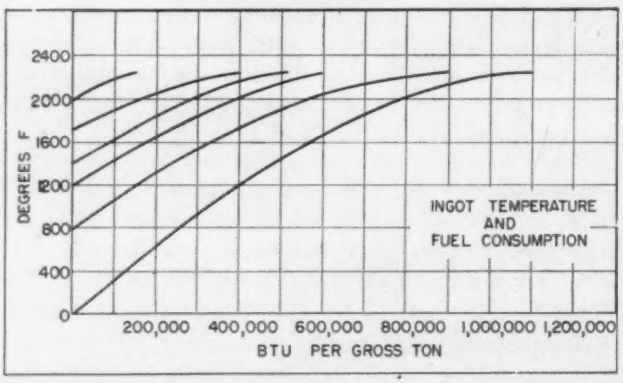
Fig. 6—Tangentially fired circular soaking pit. Courtesy Salem Engineering Co.

SEMIFINISHED STEEL

ingots are to be heated it is often necessary to cool the pits to a very low temperature before they are charged—particularly if the grade of steel is a little "fussy". In the case of heating ingots that are relatively hot when charged, it may often be necessary to "damper" the pits to prevent damage at time of charging. The difference between the ingot's temperature at the time they are charged and time of rolling largely determines the work load of the soaking pits. Optimum rolling temperature in ordinary operations with common grades of steel will vary from about 2300° F for the higher carbon and low-alloy grades to about 2450° F for the lower carbon grades. Many special steels are rolled in closely controlled ranges below or above these general values.

Temperatures of ingots at charging vary much more than rolling temperatures. They will fluctuate all the way from that of cold ingots which in winter may be lower than 32° F to as high as 2000° F. While for fuel savings it would always be desirable to charge ingots as hot as possible, there are many circumstances of plant operation which may make it necessary to "bank" certain heats of steel and certain ingots and then at some later date to reheat these cold ingots for rolling. Except for certain grades of steel, it is usually essential that the ingot be completely solidified before it is removed from the mold. Ingots poured into standard cast iron molds freeze at a rate proportional to the square root of the time, so for large ingots their average temperature may be quite low by the time they are completely solidified. When ingots are hot topped still longer times are required for complete solidification, so in ordinary practice the temperatures of so-called hot ingots may vary from a dull red of 1200° F up to 2000° F. With everything considered in present day operation, even though much steel is charged into the pits hot, a better average of fuel consumption than any value that might be estimated from Fig. 7—which could be considered as an "ideal" curve for very good operating conditions—would probably be about 1,000,000 Btu per ton.

Fig. 7—Ingot temperature and soaking pit fuel consumption for modern regenerative pits. Courtesy Rust Furnace Co.



(To be continued)

New Steel Tubing Application

PLASTIC-COATED steel tubing of the type made by Jones & Laughlin Steel Co., Pitsburgh, is seeing a new use as a dual purpose steel post in residential and light industrial construction. The Perma-Tube post acts first as an adjustable support column during the early stages of construction and after all adjustments have been completed, it is embedded in the concrete floor as a permanent fixture.

Developed by Akron Products Co., Akron, O., with Perma-Tube as the basic material, the new adjustable post, called the Mono-Post, is made of 11-gage, 3-inch OD tubing. The 7-foot post weighs about 40 pounds and the assembly is said to include welded plates at the top and bottom and a precision-built jack used in making periodic adjustments during early construction stages.

In producing Perma-Tube, lengths of J & L Electricweld steel tubing are cleaned, rinsed and dipped in a pretreatment material called Vinsynite. It is then coated inside and out with a finish coating of vinyl resin base, then proceeding through an oven which bakes and ages the coating. Aluminum pigment in the resin base gives the tubing its silvery finish. The finished post is said to be almost impervious to corrosion, durable under all atmospheric conditions, resistant to acid, alkali and corrosive influence in general and comply with Federal Housing Authority minimum requirements.

CALENDAR OF MEETINGS

Apr. 10-12, Iron & Steel Division, AIME, 33rd annual conference, Netherland Plaza Hotel, Cincinnati. AIME headquarters are at 29 W. 39th St., New York.

Apr. 10-12, American Society of Lubrication Engineers: Annual convention and show, Hotel Statler, Detroit. Society headquarters are at 343 S. Dearborn St., Chicago.

Apr. 10-14, American Society of Tool Engineers: Industrial exposition, Philadelphia Convention Hall, Philadelphia. Society headquarters are in the ASTE Bldg., 10700 Puritan Ave., Detroit.

Apr. 11-12, American Zinc Institute: Meeting, Hotel Statler, St. Louis. Institute headquarters, 60 E. 42nd St., New York.

Apr. 12-14, National Petroleum Association: Meeting, Hotel Cleveland, Cleveland. Association headquarters are in the Munsey Bldg., Washington.

Apr. 12, Association of Steel Distributors Inc.: Quarterly meeting of board of directors and meeting of Midwest region, Congress Hotel, Chicago. Association headquarters are at 150 Broadway, New York.

Apr. 12-14, American Society of Mechanical Engineers: Spring meeting, Hotel Statler, Washington. Society headquarters are at 29 W. 39th St., New York.

Apr. 13-14, American Machine Tool Distributors' Association: Meeting, Edgewater Beach Hotel, Chicago. Association headquarters at 505 Arch St., Philadelphia 6.

Apr. 14-15, Ohio State Welding Engineering Conference: Conference on economy in design and production. Make reservations with sponsor, welding engineering department, Ohio State University, Columbus 10. Downtown headquarters at Fort Hayes Hotel, Columbus.

Apr. 17-19, Society of Automotive Engineers: Aeronautic meeting and aircraft engineering display, Hotel Statler, New York. Society headquarters are at 29 W. 39th St., New York.

Apr. 19-21, American Society of Civil Engineers: Spring meeting, Los Angeles. Society headquarters are at 33 W. 39th St., New York.

Apr. 19-22, Electrochemical Society: Annual meeting, Hotel Statler, Cleveland. Society headquarters at 235 W. 102nd St., New York 25.

Apr. 20-21, Society for Advancement of Management, American Society of Mechanical Engineers: Annual time study and methods conference, Hotel Statler, New York. SAM headquarters at 84 William St., New York; ASME, at 29 W. 39th St., New York.

Apr. 23-27, American Ceramic Society: Annual meeting, Hotel Statler, New York. Society headquarters at 2525 N. High St., Columbus 2, O.

Apr. 24, Packaging Machinery Manufacturers Institute: Semiannual meeting, Hotel Sheraton, Chicago. Institute headquarters are at 342 Madison Ave., New York.

Apr. 24-26, American Mining Congress: Coal convention, Netherland Plaza Hotel, Cincinnati. Association headquarters in Ring Bldg., Washington 6, D. C.

Apr. 24-27, American Management Association: National packaging exposition, Navy Pier, Chicago. Association headquarters are at 330 W. 42nd St., New York.

Apr. 24-27, American Society of Mechanical Engineers: Process industries division and Pittsburgh mechanical engineering conference, Hotel William Penn, Pittsburgh. Sponsored by Process Industries Division and Pittsburgh chapter ASME. Society headquarters: 29 W. 39th St., New York. Cooperating societies: Engineers Society of Western Pennsylvania, Society for Advancement of Management, American Materials Handling Society.

Apr. 24-27, National Highway Users Conference: Annual meeting, in Washington.

Apr. 25-26, Metal Powder Association: Annual metal powder show, Book-Cadillac Hotel, Detroit. Association headquarters are at 420 Lexington Ave., New York.

Apr. 25-26, Machine Tool Electrification Forum: Sponsored by Westinghouse Electric Corp., at Hotel Statler, Buffalo.

Galvanized Bridge Wire

(*Continued from Page* 100)

vantage that only prestressing steel and not bond-preventing devices or end anchorages need be incorporated in the member. In some applications this overcomes the drawbacks.

Generally speaking, the bonded prestress has been indicated in light construction, particularly where duplication of parts permits mass production methods. The Germans and British have had particular success in casting long lengths of joists with bonded prestressing and cutting them into required lengths with an abrasive wheel after the manner of a bologna slicer.

Unbonded Prestressing—Unbonded prestressing has been used generally in heavy functional constructions, but its inherent functional superiority tends to expand its field of use.

In the development of prestressing members, European practice has been built around the ungalvanized cold drawn steel wire as the basic unit, used either singly or in groups wherein all wires are placed parallel to one another. One method uses a group of wires arranged in a circle for unbonded reinforcing. They are tensioned by means of jacks at the ends of the beam and anchored between a hollow cone and a conical pyramid of concrete. Another system arranges wires in the form of a rectangle anchored at the ends by means of wedges. Recesses are cast in the beam into which these "cables" are entered after the concrete has set. After prestressing is completed, grout is poured in to fill the recesses and surround the wires.

The Walnut Lane bridge, now being constructed in Philadelphia, is a good example of the latter design. The bridge has a main span of 160 feet, and two adjoining spans of 74 feet each. It is a four lane bridge 44 feet wide from curb to curb, and is designed for H20-44 loading. It is being built for the city of Philadelphia by Henry W. Horst Co., as general contractor. Prestressed concrete work is being done by the Preload Corp., New York, under a subcontract.

Specifications require that a full size test be made of one of the main girders. The prestressing consists of four cables, each containing 64 wires. The diameter of the wire is 0.276-inch. Two of these cables are straight and parallel to the axis of the member. The other two are curved in the form of a parabola. Based on European experience, test loads were provided having a total weight equal to ten times the design live load, on the assumption that this would cause failure of the beam. Actually, the beam carried this load without failure.

Americanized System — Thoughout its development work in this field, the Roebling Co. has recognized that European practices could not satisfactorily be transplanted intact to this country. As a result, an Americanized system of prestressed concrete design is now emerging from the laboratory.

Basic unit is galvanized bridge wire. Many of these wires are necessary, of course, to prestress a structure of any size. From the American point of view, the most logical means of grouping these wires is in the form of the time tested prestretched galvanized bridge strand or bridge rope. Thus the fabrication of the prestressing "cables" is put back in the manufacturing plant, where it belongs, according to American practice. Slim cylindrical end terminals have been developed for these cables. They are attached in the factory by means of a hydraulic press. These terminals are threaded for nuts which rest against bearing plates in the completed concrete member.

Cables remain free of bond throughout the life of the structure. This external anchoring of unbonded reinforcing makes it possible to take all the guesswork out of prestressed concrete design. Assumptions regarding shrinkage or plastic flow of concrete or creep of steel can be checked at any time by measuring the tension in the prestressing member. At the same time the tension can be increased if necessary.

In these studies the advantages of

SPECIAL ROEBLING ACID STEEL PRESTRESSED-CONCRETE WIRE

Type 1. Uncoated

Ultimate Strength	240,000 psi. Min.
0.7% Elongation at	180,000 psi. Min.
Minimum Ultimate Elongation	4%
Allowable Design Stress	120,000 psi. Max.
Allowable Tensioning Stress	135,000 psi. Max.

Dia.	Area	Design Load per Wire (lbs.)	Tensioning Load per Wire (lbs.)
0.276	0.05983	7200	8100
0.236	0.04374	5250	5900
0.196	0.03017	3600	4100

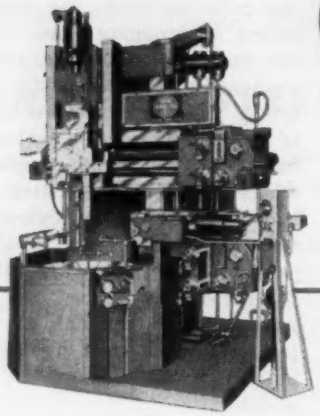
Type 2. Galvanized

Ultimate Strength	220,000 psi. Min.
0.7% Elongation at	175,000 psi. Min.
Minimum Ultimate Elongation	4%
Allowable Design Stress	105,000 psi. Max.
Allowable Tensioning Stress	120,000 psi. Max.

Dia.	Area	Design Load per Wire (lbs.)	Tensioning Load per Wire (lbs.)
0.196	0.03017	3200	3600

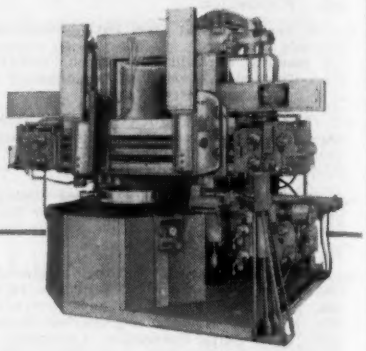
INDUSTRY SELECTS

BULLARD

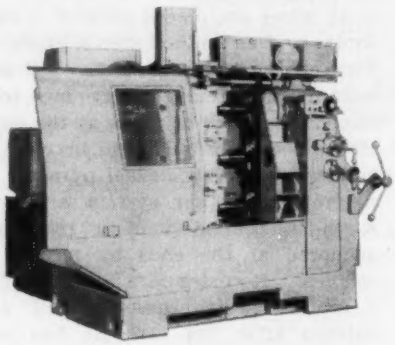


36" Man-Au-Trol Vertical Turret Lathe

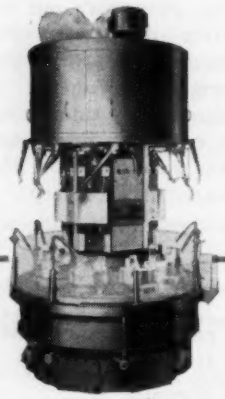
Man-Au-Trol V. T. L.'s in six sizes 30" — 36" with two heads 42" 54" — 64" — 74" with three heads



54" Man-Au-Trol Car Wheel Lathe

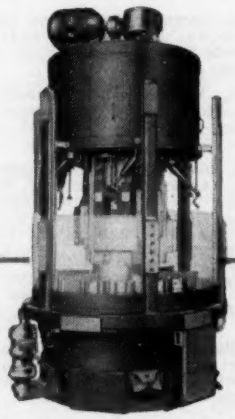


Man-Au-Trol 3 Spindle Horizontal Lathe

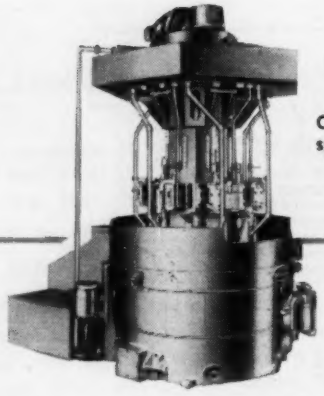


Mult-Au-Matic Type "D"

Mult-Au-Matic Type "D" 8" — 12" — 16" with 6 or 8 spindles, Type "D" 16-23 and Type "K" 6 spindles — twin 6 spindles — 8 spindles and twin 8 spindles



Mult-Au-Matic Type "K"

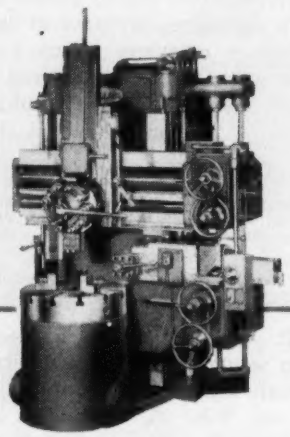


Contin-U-Matic Types "RD" and "RDH" 3 and 6 spindles in 10" — 14" — 20" and Twin Spindle

THE

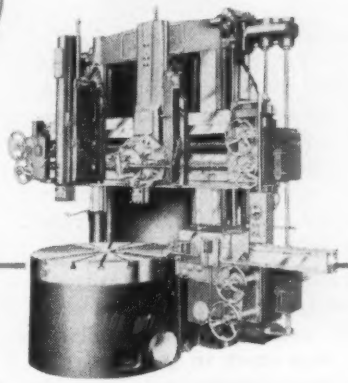
for Manufacturing Economy

BULLARD

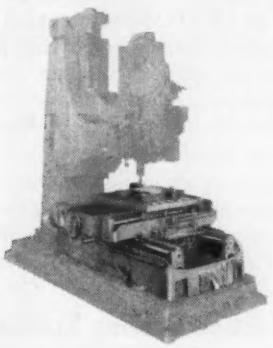


30" Cut Master Vertical Turret Lathe

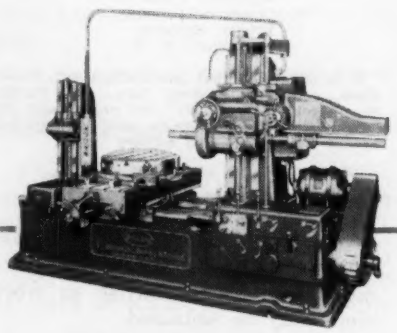
Cut Master Vertical Turret Lathes in six sizes 30" — 36" — 42" — 54" — 64" and 74". The 30" and 36" sizes have two heads while 42" — 54" — 64" and 74" have three heads obtainable in various combinations



54" Cut Master Vertical Turret Lathe

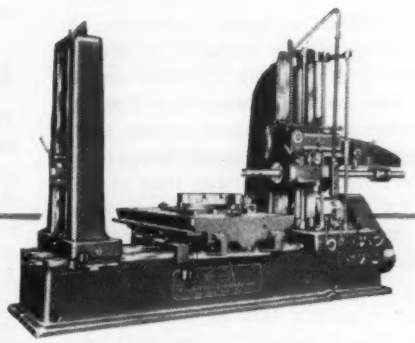


30 x 20 Spacing Table mounted on Super Service Drilling Machines. It may also be mounted on 4' — 5' or 6' Radial Drills



3" Spindle Bullard-Universal Horizontal Boring Machine

3" — 4" and 5" Spindle Bullard-Universal Horizontal Boring, Milling and Drilling machines are available with various Bed Lengths and Post Heights



4" Spindle Bullard-Universal Horizontal Boring Machine

BULLARD COMPANY

BRIDGEPORT 2, CONNECTICUT U.S.A.

parabolic prestressing were self-evident. The vertical shear is taken by the cables. Furthermore, the eccentricity of the prestressing load is greatest at mid span where it is most beneficial and is zero or very small at the end of the span where its presence is detrimental.

To make prestressing most effective, most of the dead weight to be supported by the member should be in place at the time the member is prestressed. This leads to the selection of a shape such as the hollow box as the most efficient cross-section. Thus, for a bridge floor, for instance, the top of the prestressed member also serves as the roadway surface.

In addition to its structural efficiency, the box makes it possible to precast the span in many sections, assemble them, prestress the assembly, and have a finished unit containing prestressing members in a dead air space for long time protection. These investigations included several molded studies.

Allowable Stress in the Prestressing Steel — In European design, shrinkage and plastic flow of the concrete, and creep in the prestressing steel, are considered as more or less unknown. It is recognized that maximum limits can be determined with assurance and therefore that safe assumptions can be made, but definite values are not known. As far as the concrete is concerned, continuing research is being conducted on both sides of the Atlantic in an attempt to erase this question mark. Progress is being made but the experts are still far apart, except as to maximum limits. For instance, there is good reason to believe that plastic flow is practically nonexistent when the concrete is restrained in both directions, but, by far the large majority of the authorities are not yet ready to accept this as a conclusion. Thus, this is something we will have to live with in both prestressed and ordinary reinforced concrete until more is known on the subject.

As far as the steel is concerned, when cold drawn steel is stressed beyond its proportional limit some inelastic stretch or creep must be expected, although it will reach stability in a more or less indefinite time unless the stress is above its true yield point. However, if the stress is below the proportional limit, one can assume with assurance that there will be no creep. European practice involves the use of unit stresses which are in the neighborhood of 1¾ times the proportional limit of the steel. It is our contention that this need not be done, and that the steel can and should be treated in such a manner as to increase its proportional limit to such a point that it will not be exceeded even by allowable unit stresses of the order of those used in Europe. Steels have already been developed to meet this requirement for both galvanized and ungalvanized wire. The latter is being used on the Walnut Lane bridge.

Galvanized steel can be given an initial prestress of 120,000 psi without exceeding the proportional limit. Allowing a relaxation of 15,000 psi for shrinkage and plastic flow of the concrete, this leaves a balance of 105,000 psi for a design prestressing tension in the case of unbonded reinforcing which is "post-stressed". The correponding values for the ungalvanized wire are 135,000 psi and 120,000 psi.

600-Foot Drying Oven

FOR continuous drying and conditioning of extrusion coated low hydrogen and stainless steel welding electrodes is a 600-foot long electrode drying oven in operation at the electrode plant of Harnischfeger Corp., Milwaukee. Said to be the largest unit of its kind, it has six separate temperature zones and a possible temperature variation from room temperature up to 1000° F.

Each zone is equipped with separate humidity, temperature and speed controls and processing time may be varied from 20 to 120 minutes.

Antifriction Bearing Standard

MOST acceptable methods of determining whether bearings conform to specified dimensions are included in a 12-page standard on "Gaging Practices for Ball and Roller Bearings", published by American Standards Association, New York 17, N. Y. First of a series under development by a committee representing 14 associations of engineers, industrial users and manufacturers of bearings and the Army and Navy Departments, the standard provides a means of these representatives to "talk the same language".

Standard defines inspection methods, giving gaging loads and methods of measurement. Methods are related for obtaining dimensions of inner and outer rings, parallelism of sides, eccentricity, groove parallelism with sides, and other significant measurements. Also prescribed are methods of measuring internal fit and tolerances for side runout of lock nuts. Other standards on bearing tolerances, boundary dimensions, definitions and terminology are on the committee's program.

LETTERS
to the Editors

Re: Flame Hardening

Would you please obtain for us a copy of "Flame Hardening Method" written by Stephen Smith and published in your magazine of Nov. 13th 1939. Should you have any other articles on the subject of flame hardening, could you also send us some representative copies chosen at your own discretion. We have at our plant a rather extensive set-up for doing this work and are interested in anything new relative to the subject.

J. H. McMillan, Manager
Sales and Purchases
Maritime Steel & Foundries Ltd.
New Glasgow, Nova Scotia

Tearsheets of the Nov. 13, 1939, article, along with several more recent articles on flame hardening, are being sent.—The Editors

Steel Wool

It would be greatly appreciated if you would send me tearsheets of the article which appeared on page 86-87 in the Feb. 25, 1946 issue of your publication. If this is not possible, kindly give me several names of manufacturers of machinery for the production of fine steel wool (Brillo type).

Raymond Treuil
Commercial Counselor
French Embassy
New York, N. Y.

It is suggested that you contact Col. Crosby Field, president, Flakice Corp., 360 Furman St., Brooklyn 2, N. Y. We understand that he developed the machinery and methods used by the Brillo Co.—The Editors

Cold Extrusion Equipment

Will you kindly furnish us with data on equipment using cold extrusion techniques or advise us where same may be obtained.

Leo J. Kujawa
Brighton Tool & Die Co.
Brighton, Mich.

Lake Erie Engineering Co., Buffalo, N. Y., Clearing Machine Corp., Chicago, Ill., National Machinery Corp., Tiffin, O., and Hydraulic Press Mfg. Co., Mt. Gilead, O., are known to be working on the cold extrusion project under Defense Department sponsorship.—The Editors

Old—But We Have It!

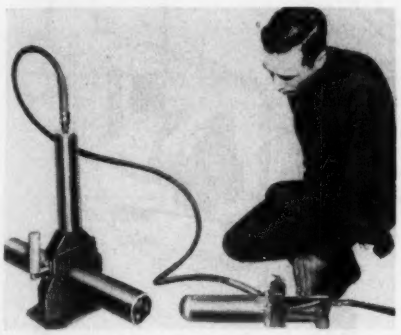
We came across, in the Mai, 1945, issue of Werkstatt un Betrieb, a German translation of an article entitled, "Powder Metal Parts," by G. W. Birdsall, and which appeared in your April 16, 1945, issue. The subject is of great interest for us, and we wonder if you could let us have either clippings or photostats of same.

P. Chevalier
L'Outillage RBV
Paris, France

New Products and Equipment

Cuts Large Cable

Insulated electric and armored cable up to 3½ inches OD may be cut by a portable, hydraulic cutter announced by Manco Mfg. Co., Bradley, Ill. Called the Guillotine, the model 3-C cutter is offered with a choice of three portable pump units. Illustrated model has an air-hydraulic



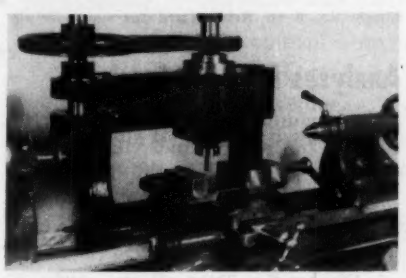
pump assembly operating off any compressed air source of 100 pounds pressure.

Unit is also available as an electric hydraulic pump assembly for 110 or 220 v. operation. For cable salvage work, the pump units are recommended. The basic cutting unit may be supplied with a separate hand pump assembly for work in the field.

Check No. 1 on Reply Card for more Details

Milling Attachment for Lathe

Attaching to any 9 or 10-inch lathe and driven by the lathe head is a vertical milling machine built by C. G. Forsman Co., 914 Elliott St. S.E., Grand Rapids 7, Mich. Ball bearings are used throughout and inside taper



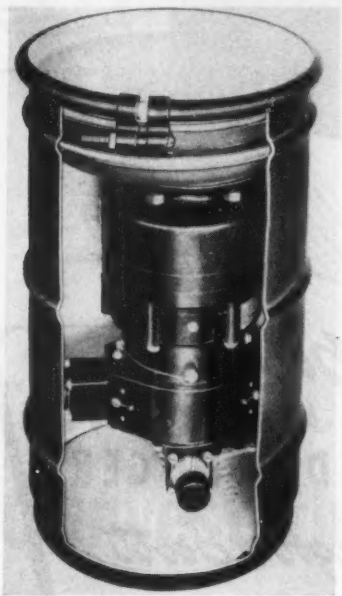
is a Morse No. 3. A draw tube for standard collets is provided for holding straight shank cutters.

Work is held in a swivel vise mounted on the cross-slide. Maximum clearance under the vertical spindle is 3½ inches on a 9-inch South Bend lathe. Horizontal vise travel is 5 x 6 inches and spindle vertical travel is 2 inches. Use may be for tool work and long shaft machining of keyway and squared surfaces.

Check No. 2 on Reply Card for more Details

Shipped and Arrive Fresh

Generators, small engines and motors are some of a variety of products which may be shipped and which will arrive in an "as shipped" condition in steel containers built by Steel Drum Packaging & Accessories Inc., 9505 Sandusky Ave., Cleveland, O. An inner pack in the drum holds



the contents firmly in place, allowing a minimum of 1 inch clearance on all sides. A supply of silica gel placed inside prior to sealing will keep contents ready for instant use for a period as long as 10 years.

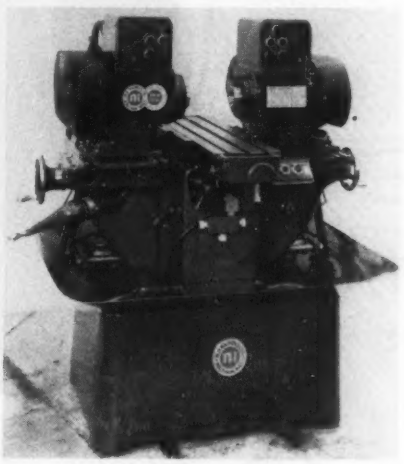
Containers realize savings in packaging time and may be used for storing of materials. Mounting holes on the unit itself are used. Containers are easily marked for identification purposes and, packed on pallets, are easily handled. Standard inner packs of various designs are available; special designs can be engineered.

Check No. 3 on Reply Card for more Details

Mills Two Surfaces at Once

Two or more surfaces may be milled simultaneously, although requiring but one fixture and one operator, on the Nichols twin mill, manufactured by Nichols-Morris Corp., Waltham, Mass. Machine is intended for automatic light, high speed milling operations on all machinable materials to close limits. The two independently geared head milling units are mounted opposite each other on the knee and saddle assemblies of conventional design. Machine table reciprocates automatically between milling heads.

Each head is V-belt driven by its own 1 hp pancake type motor. A



selection of 15 spindle speeds in geometric progression is provided. Saddles carrying milling heads have micrometer screw feed traverse adjustments. Knees supporting the saddle and head assemblies have micrometer screw feed vertical adjustments controlled by hand crank. Table drive is pneumatic and solenoid-controlled, with trips and limit switches.

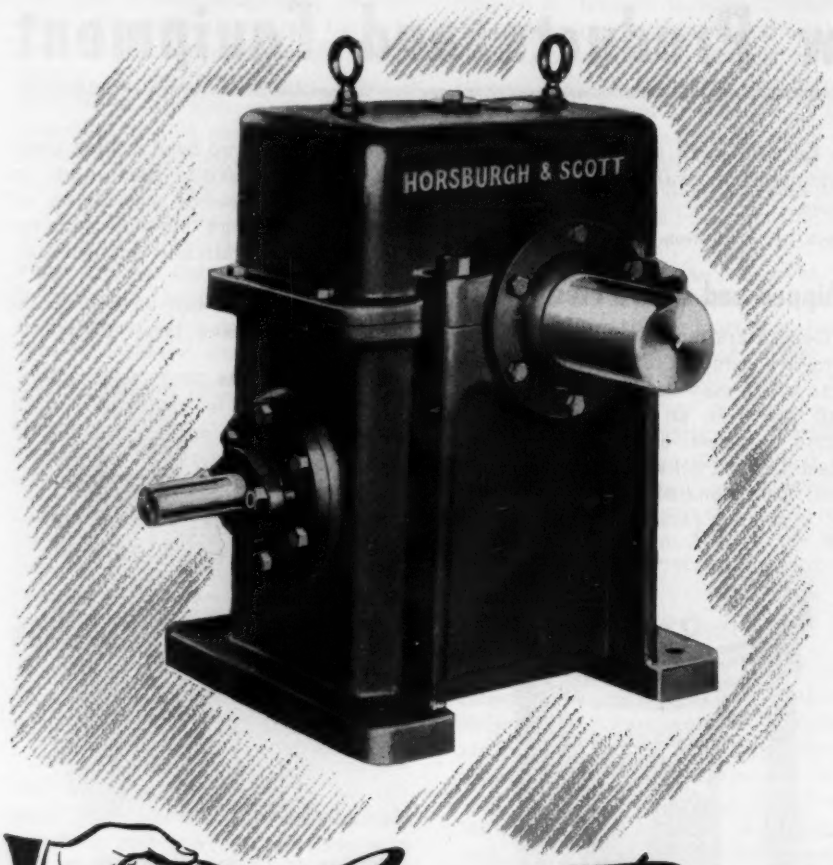
Check No. 4 on Reply Card for more Details

Power Wheelbarrow Improved

Steering gear ratio has been increased to 4 to 1 with the installation of a large steering wheel in place of the lever bar arrangement on the 1950 model Moto-Bug power

wheelbarrow, made by Kwik-Mix Co., Port Washington, Wis. Unit has a rated hopper capacity of 10 cu ft or 1200 pounds on the platform body.

It is powered by a 4 hp gasoline engine and travels at speeds of 1½ to 4 mph, both forward and reverse.



Compact

WORM GEAR SPEED REDUCERS

by Horsburgh & Scott

An important feature of Horsburgh & Scott Worm Gear Speed Reducers is compactness . . . reducer can be mounted as a unit on driven machines . . . making possible its use where other drives might interfere with aisles, walls or other machinery. Designed for simplicity with only two moving parts, this precision unit has 10 outstanding advantages and is obtainable in 8 types with reductions from 3⅝ to 1 up to 10,000 to 1 . . . right-angle drives available in ratios up to 700 to 1.

Send note on Company Letterhead for Speed Reducer Catalog 46

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

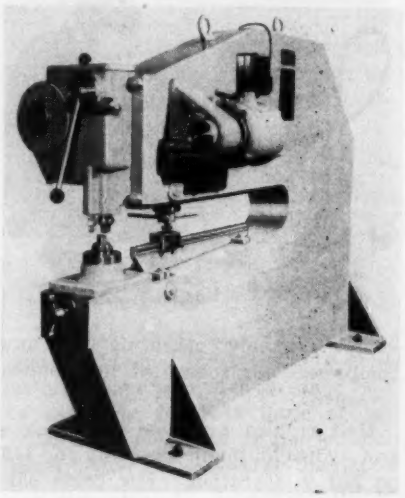
5112 HAMILTON AVENUE • CLEVELAND 14, OHIO, U. S. A.

Operator may either walk behind the machine or ride on an optional step. A direction indicator is included with the new steering feature.

Check No. 5 on Reply Card for more Details

Plate Cutting Machine

Cutting is performed by means of a movable upper tool which operates at a very high reciprocating speed on the Pullmax Major sheet steel and plate cutting machine, offered by American Pullmax Co. Inc., 2627 N. Western Ave., Chicago 47, Ill. The



cutting operation does not chip or deform edges and in most cases, edges require no further finishing after cutting.

Machine will cut the finest gage steel of $\frac{1}{32}$-inch thickness. Ability to do straight cutting inside or outside circle cutting, inside or outside square or design cutting, slot cutting, beading, folding, flanging and nibbling are within the machines' realm. Stainless steel, all types of nonferrous metal, wire mesh and plastic sheets may be handled.

Check No. 6 on Reply Card for more Details

Analyzes Dynamic Strains

Four simultaneous dynamic stresses due to impact and vibration are recorded and displayed in correct time relationship on the face of a single cathode ray tube incorporated in the strain analyzer, a development of Electronic Tube Corp., 1205 E. Mermaid Lane, Philadelphia 18, Pa. With this dynamic strain analyzer, it is possible to study dynamic strain characteristics and instantaneous loading conditions such as occur on drop hammer, punch presser, etc.

Amplifiers, strain gage bridge units and all operating controls are contained in a steel cabinet measur-

How do your employees WANT to invest their savings?

People are *more than twice as inclined* to invest their extra money in Savings Bonds as in any other form of savings or investment, according to the 1949 Survey of Consumer Finances*. That's adequate proof that your employees want your company to have the Payroll Savings Plan, by which they get the convenience of obtaining bonds regularly and "automatically"— delivered with their pay checks.

More than 20,000 companies operate Payroll Savings. The managements of these companies know it's "good relations" to provide this convenience. They can *see* the company-benefits in improved worker efficiency and stability. They know, too, that it's "good business"—because Payroll Savings boosts Bond sales, and Bond sales create a huge backlog of purchasing power that's "business insurance" for the years ahead.

Of course every Bond buyer builds financial independence because his Bonds at maturity will return $4 for every $3 he invests. Holding Bonds, moreover, helps him to realize he's making a profit on his job . . . makes him more resistant to influences which are unfavorable to our economic system.

It's *easy* to install Payroll Savings

Don't think that installing Payroll Savings is "a lot of work." All you need to do is appoint one of your top executives as Savings Bonds Officer and tell him to get in touch with your State Director, Savings Bonds Division, U. S. Treasury Department. The State Director will provide application cards, promotional material, and as much personal help as necessary. Remember—Payroll Savings *pays!*

**Sponsored by the Board of Governors of the Federal Reserve System and conducted by the University of Michigan. Based on 3,500 interviews in 66 sampling areas throughout the nation.*

The Treasury Department acknowledges with appreciation the publication of this message by

STEEL

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.

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For your protective or treating atmospheres in bright annealing, nitriding, sodium hydride descaling, brazing, normalizing and sintering—use Du Pont "National" Anhydrous Ammonia. You get pure commercial ammonia by the highest standards, at no extra cost. As for dryness, the moisture content is less than fifty parts per million. Distributors and stock points are located across the country . . . to assure you of quick delivery whether you order one cylinder or fifty.

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HYDROXYACETIC ACID 70%—For bright dipping of copper, electro-polishing of stainless steel and electroless plating of nickel.

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Product sheets on these and other chemicals are available. Please write on your letterhead to: E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Department, Wilmington 98, Delaware.

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POLYCHEMICALS DEPARTMENT

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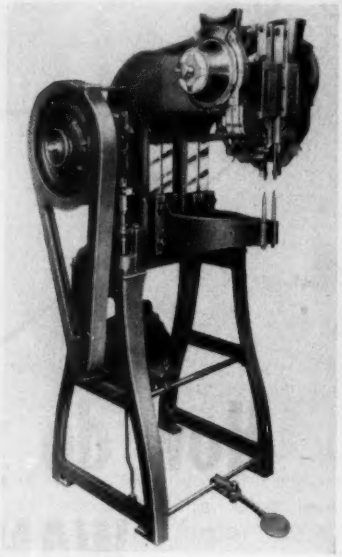
818 Olive Street, St. Louis 1, Missouri

ing 30 x 24 x 24 inches. Power supply is in a separate cabinet. For photographic recording, the device is equipped with a Fairchild Oscillo-Record camera which has an electronic speed control unit. Instrument is designed for use in conjunction with Baldwin SR-4 resistance-type strain gages.

Check No. 7 on Reply Card for more Details

Adjustable Rivet Setter

Riveting centers are adjustable on the model 214 double rivet setter offered by Chicago Rivet & Machine Co., Bellwood, Ill. The machine has a 14-inch throat and will set $\frac{3}{64}$-



inch steel tubular rivets, including lengths to $\frac{5}{8}$-inch. Standard unit has riveting centers adjustable from $\frac{3}{8}$ to 7 inches. Special models are available with centers from $\frac{3}{8}$ to 15 inches.

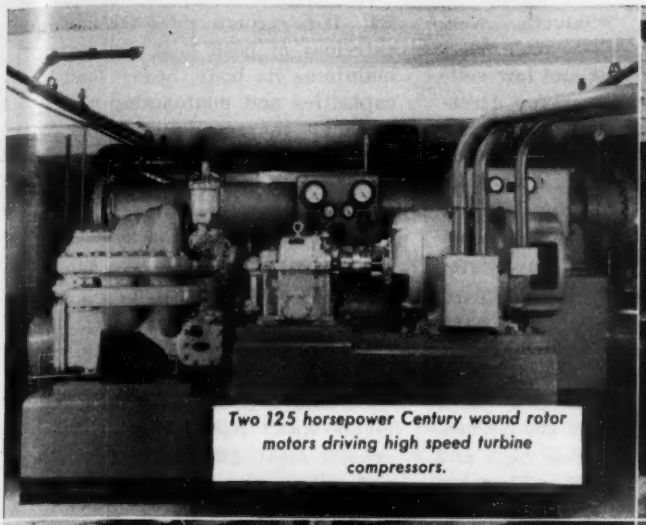
Check No. 8 on Reply Card for more Details

• • •

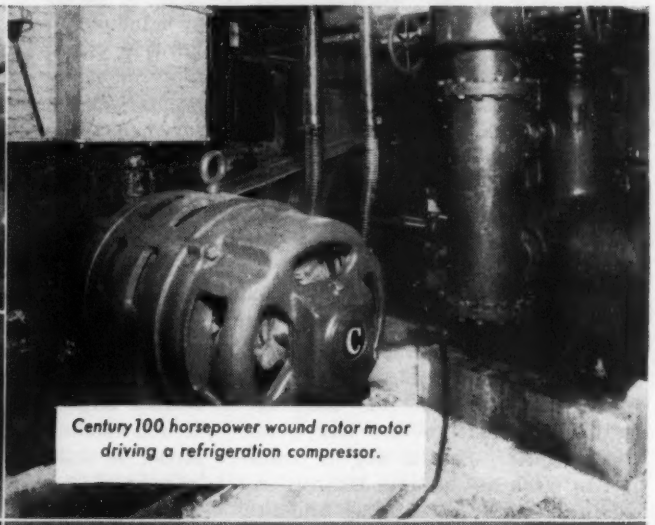
SILICONE RUBBER SPONGE: Made by Connecticut Hard Rubber Co., New Haven, Conn., a new Cohrlastic silicone rubber sponge is available. It has a density of 25 to 35 cubic inches per pound which will resist temperatures from minus 100° F to plus 500° F and is used as a vibration dampener for extreme temperatures.

Check No. 9 on Reply Card for more Details

LIGHT FLEXIBLE PIPE: Resisting rot, rust and electrolytic corrosion is Carlon E lightweight and flexible plastic pipe, made by Carter Products Corp., 10225 Meech Ave., Cleveland 5, O. It may be used in handling corrosive fluids and gases, a wide range of concentrated and



Two 125 horsepower Century wound rotor motors driving high speed turbine compressors.



Century 100 horsepower wound rotor motor driving a refrigeration compressor.

Century 75 and 30 horsepower wound rotor motors driving a bending roll.

Century wound rotor motor.

HERE ARE 4 WAYS TO TAKE ADVANTAGE OF THE FLEXIBLE POWER OF

Century

WOUND ROTOR MOTORS

Meet Load Characteristics for:

1. *Adjustable varying speeds control variable process and other load conditions.*
2. *Reversing direction of operation of heavy loads — as in lift bridges.*
3. *Syncro-speed, multiple drives used where two or more operations must be coordinated.*
4. *High starting torque with low starting current — such as reciprocating compressors, steel plate bending rolls, etc.*

Century wound rotor motors are built in sizes up to 400 horsepower and are available in open protected and splash proof frames. In addition, Century builds a complete line of AC and DC motors in sizes from 1/6 to 400 horsepower for all popular requirements.

Specify Century motors for all your electric power needs.

ALTERNATING CURRENT MOTORS

POLYPHASE
Squirrel Cage Induction—
1/6 to 400 H.P.
Wound Rotor Motors—
1 to 400 H.P.
Synchronous Motors—
20 to 150 H.P.

SINGLE PHASE
Split Phase Induction—
1/6, 1/4, 1/3 H.P.
Capacitor—1/6 to 20 H.P.
Repulsion Start, Brush Lifting, Induction—1/2 to 20 H.P.

DIRECT CURRENT MOTORS
1/6 to 300 H.P.

GENERATORS
AC, .63 to 250 KVA
DC, .75 to 200 KW

MOTOR GENERATOR SETS
AC to DC, AC to AC
DC to DC, DC to AC

Open Protected, Splash Proof, Totally Enclosed Fan Cooled, Explosion Proof.

Ball Bearing motors are factory lubricated for several years' normal service. Bearing housing construction permits easy re-lubrication when unusual service demands it.

CENTURY ELECTRIC COMPANY
1806 Pine St. • St. Louis 3, Missouri
Offices and Stock Points in Principal Cities

Century C MOTORS

dilute acids, alkalies and caustics. A 100-foot section of 2-inch diameter weighs about 90 pounds and may be connected in 2 minutes. It resists breaking in the temperature range minus 50 to plus 140° F. Fittings for all sizes from ½ to 6 inches are available.

Check No. 10 on Reply Card for more Details

GRINDER DOG: Made of drop forge steel, a new grinder dog that will not break is available from Ready Tool Co., Bridgeport, Conn. It is perfectly balanced, has side nuts for locking adjustments and has a reversible jaw. Red E dog is made in five sizes to accommodate all capacities from ¼ to 6 inches and fits all makes of cylindrical grinding machines.

Check No. 11 on Reply Card for more Details

GEAR HEAD MOTORS: Slo-Speed gear head motors, offered by Sterling Electric Motors Inc., Los Angeles 22, Calif., can be mounted in any position. They feature weatherproof design, high efficiency due to an integrally built unit with helical gears, the herringbone rotor and heavy duty ball bearings lubricated for life.

Check No. 12 on Reply Card for more Details

FAST ACTION—LESS CURRENT: Designated as type DS line, new Quick-as-Wink valves are introduced by C. B. Hunt & Son Inc., Salem, O. These double solenoid, pilot operated, single plunger control valves employ small solenoids that give fast action and reduce current requirements. They are available in ⅜, ½, ¾, 1, 1¼, 1½ and 2-inch sizes.

Check No. 13 on Reply Card for more Details

SOLUBLE OIL CLARIFIER: A. F. Holden Co., New Haven 8, Conn., announces a soluble oil clarifier that eliminates the rancid effect in soluble oils. It controls the alkalinity and eliminates toxic elements that cause the oil to become rancid.

Check No. 14 on Reply Card for more Details

SUBMINIATURE SWITCH: Micro Switch, Freeport, Ill., announces a new subminiature plastic cased switch measuring 49/64 x 3/8 x 1/4-inch. It has a pin plunger actuator and circuit arrangement is single-pole, double throw. Terminals are solder lug type.

Check No. 15 on Reply Card for more Details

1 TO 40 KV OUTPUT: Model No. 99, a new variable high voltage radio frequency power supply that delivers from 1 to 40 kv output, either negative or positive polarity, is announced by Inductograph Products, New York 19, N. Y. It can provide 6.3 v filament heater current and low voltage direct current power for accessory electronic regulating or controlling equipment which my be used simultaneously with the variable high voltage output.

Check No. 16 on Reply Card for more Details

TRUCK WITH SUPPORT: Tricart, a light weight tubular steel hand truck with adjustable tripod support and leverage plate, is introduced by Melooz Mfg. Co., Los Angeles, Calif. It will handle loads up to 600 pounds. Model A stands 45 inches high and has three rungs; model B is 52 inches high and has four rungs.

Check No. 17 on Reply Card for more Details

PROLONGS LIFE: To prolong life and increase efficiency of diesel, gasoline and electric motors and engines as well as pistons, gears, bearings and all moving machine parts, a new lubricating additive has been developed by Power Ball Oil Co. Inc., Columbia, S. C. Features of the oil bracer include rust proof, detergent and penetrating properties.

Check No. 18 on Reply Card for more Details

CUTTER FOR STEEL DRUMS: Michael A. Schinker Mfg. Co., Chicago 36, Ill., offers a head cutter that cuts the head of any size drum. It is manually operated and will work equally well on empty or filled drums from 10 to 55 gallon sizes and 20 to 16 gage stock. Cut leaves no ragged edges and metal is flanged slightly inward.

Check No. 19 on Reply Card for more Details

FOOT SWITCHES: A new line of versatile foot switches which can be supplied in standard models or can be quickly altered at the factory to suit any specifications, is introduced by Pioneer Patents & Products Co., Chicago 6, Ill. Switches give machine operators freedom of both hands.

Check No. 20 on Reply Card for more Details

MULTIPURPOSE LACQUER: Base C 5015, a new multipurpose lacquer, developed by United Lacquer Mfg. Corp., Linden, N. J., may be used to finish all types of metal products. It may be applied by spraying or dipping and is available in clear or colors, in either full gloss, semigloss or flat finish.

Check No. 21 on Reply Card for more Details

OIL FOR EXTREME TEMPERATURES: Known as Gulflite oil 5W, a new oil for hydraulic motors, pumps and similar equipment is being marketed by Gulf Oil Corp., Pittsburgh, Pa. It is recommended for use under extremes of both heat and cold. It maintains its body, heavy load-carry capacities and nonfoaming and free-flowing characteristics throughout the entire range of temperatures in which such equipment is normally operated.

Check No. 22 on Reply Card for more Details

LIGHTING UNIT: Hi-Bay model 66 lighting unit with a permanently silvered reflector is introduced by Midwest Lighting Products Co., Cleveland 7, O. It features a patented double-wall, hand blown, flawless, crystal clear glass reflector. Highly reflective silver plating is spun coated to the facet designed inside of the double walls of the reflector.

Check No. 23 on Reply Card for more Details

MEASURES MOST OF LEAST: Developed by Distillation Products Industries, division of Eastman Kodak Co., Rochester 14, N. Y., is a new ionization gage control circuit that measures vacua as low as 2×10^{-9} mm Hg.

Check No. 24 on Reply Card for more Details

GENERAL PURPOSE CONTROL: Series 20 photoelectric control, offered by Photoswitch Inc., Cambridge 42, Mass., is designed for general industrial and machinery application. It is available with phototube integral with control or located in a separate small housing. It is supplied with forward and reverse circuits so that tube replacement is indicated by either an energized or de-energized relay.

Check No. 25 on Reply Card for more Details

CONTROLS TEMPERATURES: Model J Gardsman controller announced by Taco West Corp., Chicago 22, Ill., is designed primarily for the control of industrial furnace temperatures. However, its basic features enable it to be used for the control of numerous industrial and laboratory processes, such as torque, pressure and vacuum. It is available either as a two position or as a proportioning controller.

Check No. 26 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

STEEL supply is tightening and demand is booming. Seasonal expansion in requirements is adding to stringency resulting from tonnage lost in the coal and steel strikes. Demand-supply conditions, especially in the light, flat-rolled products, are reminiscent of the immediate post-war scarcity period. Conversion deals are increasing. Gray market offerings are more numerous at some points. More rigid distribution controls are being applied even on such products as bars, plates and shapes. Sales of imported steel are making headway.

OUTLOOK— Despite the accelerated demand, a note of caution persists for the last half of the year. Leveling off in activity is expected once consumer inventories are replenished. Possible serious automotive labor trouble is cause for some apprehension. Nevertheless, market opinion today overwhelmingly anticipates no summer slackening in pressure. Vacation shutdowns in July and accompanying production losses, are thought likely to extend supply-demand imbalance to Labor Day at least. By that time normal seasonal upturn may be under way to assure continuance of high-level steel production through remainder of the year.

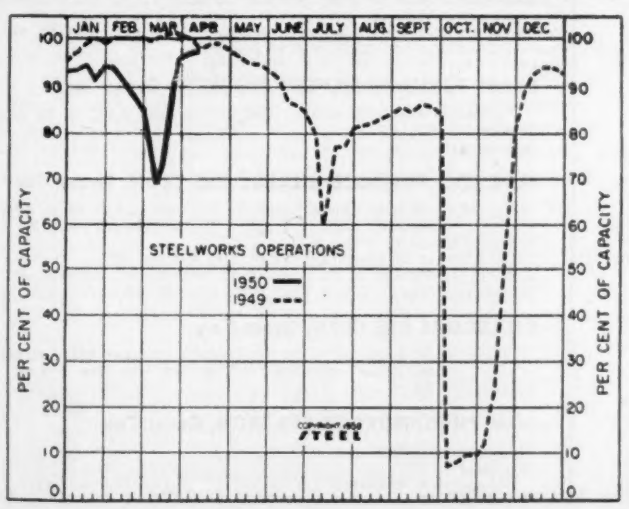
DEMAND— Not only is consumer demand more pressing but it is more diversified. Heavier items are coming in for more buyer attention while the clamor for sheets and strip is unabated. Structural requirements are rising. Bars and plates are under growing pressure, specifications increasing from the railroad carbuilders and heavy equipment manufacturers. In sheets and strip, no signs have appeared of early demand abatement with conversion deals spreading to miscellaneous consuming lines. Automotive and home appliance needs are well sustained. Only in the lighter appliances, irons, toasters and household fixtures, is any slowing down noted. Warehouse order volume is up.

SUPPLY— Relief of tight supply in the light, flat products is unlikely for months. Producers of hot and cold-rolled and galvanized sheets have far more tonnage scheduled this quarter than they can produce barring substantial order cutbacks. Even deliveries of specialties, such as stainless, are more extended. Flat-rolled order backlogs now carry well into summer. Structural steel deliveries have been pushed back 7 to 10 weeks. Carbon bar producers are almost sold out for second quarter on smaller sizes, and on the larger sizes shipments extend up to 8 weeks. Excess plate orders are being diverted from midwestern mills to eastern producers who are inclined to confine orders to their regular trade, which is picking up.

IMPORTS— Foreign steel is finding purchasers. While the tonnage is relatively small it is sufficient to cause concern to domestic sellers, especially along the eastern seaboard. Tonnage is arriving at Gulf and Pacific Coast ports also, and opening of Great Lakes shipping may permit cargo movement to lake ports direct from Europe. Only a small proportion of imports is in the light, flat-rolled items.

OPERATIONS— National steelmaking rate rose ½ point last week to 97.5 per cent of capacity, equivalent to production of more than 1,850,000 tons. This is the largest tonnage in a year.

PRICES— Revision in hot strip extras by Inland Steel Co. is the only change of note pricewise. However, gray market offerings of cold-rolled sheets are appearing at prices considerably above the standard market. Reflecting overall strength in scrap, STEEL's price composite on steelmaking grades rose to $28.83 last week from $28.75. Weighted index on finished steel is unchanged at 156.13 while the arithmetical finished steel composite holds at $93.18. Pig iorn composites are steady with No. 2 foundry, $46.47, basic, $45.97, and malleable $47.27.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Apr. 8	Change	Same Week 1949	Same Week 1948
Pittsburgh	96.5	— 3*	98	86
Chicago	100.5	— 0.5*	98.5	93
Eastern Pa.	91	+ 2	94.5	65
Youngstown	105	+ 5	105	60
Wheeling	102.5	0	95.5	87
Cleveland	95.5	— 1.5	101.5	95.5
Buffalo	104	0	104	54
Birmingham	100	0	100	45
New England	80	— 1	88	80
Cincinnati	102	+ 5	104	96
St. Louis	84.5	— 6.5	77.5	89.5
Detroit	106	— 1	107	104
Western	95	0	102	..
Estimated national rate	97.5	+ 0.5	98.5	78

Based on weekly steelmaking capacity of 1,906,267 net tons for 1950; 1,843,516 net tons for 1949; 1,802,476 net tons for 1948.
*Change from revised rate.

Composite Market Averages

	Apr. 6 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	156.13	156.13	156.13	154.01	100.65
Index in cents per lb...	4.230	4.230	4.230	4.172	2.727
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$93.18	$93.18	$93.18	$94.50	$57.55
No. 2 Fdry Pig Iron, GT	46.47	46.47	46.47	46.63	24.67
Basic Pig Iron, GT.....	45.97	45.97	45.97	46.22	24.00
Malleable Pig Iron, GT..	47.27	47.27	47.27	47.34	25.29
Steelmaking Scrap, GT..	28.83	28.75	27.50	25.50	19.17

Weighted finished steel index based on average shipments and prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Apr. 6 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.45	3.45	3.45	3.35	2.15
Bars, H.R., Chicago	3.45	3.45	3.45	3.35	2.15
Bars, C.F., Pittsburgh	4.10–15	4.10–15	4.10–15	3.95	2.65
Shapes, Std., Pittsburgh ..	3.40	3.40	3.40	3.25	2.10
Shapes, Std., Chicago	3.40	3.40	3.40	3.25	2.10
Plates, Pittsburgh	3.50	3.50	3.50	3.50	2.20
Plates, Chicago	3.50	3.50	3.50	3.40	2.20
Plates, Coatesville, Pa. ..	3.60	3.60	3.60	3.75	2.20
Plates, Sparrows Point, Md.	3.50	3.50	3.50	3.45	2.20
Plates, Claymont, Del. ...	3.60	3.60	3.60	3.95	2.20
Sheets, H.R., Pittsburgh ..	3.35	3.35	3.35	3.25–30	2.20
Sheets, H.R., Chicago 3.35		3.35	3.35	3.25	2.20
Sheets, C.R., Pittsburgh ..	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Chicago	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Detroit	4.30	4.30	4.30	4.20	3.15
Sheets, Galv., Pittsburgh .	4.40	4.40	4.40	4.40	3.65
Strip, H.R., Pittsburgh ...	3.25	3.25	3.25	3.30–40	2.10
Strip, H.R., Chicago	3.25	3.25	3.25	3.25–30	2.10
Strip, C.R., Pittsburgh ...	4.15	4.15	4.15	4.00–75	2.80
Strip, C.R., Chicago	4.30	4.30	4.30	4.00–25	2.90
Strip, C.R., Detroit	4.35–40	4.35–40	4.35–40	4.20–50	2.90
Wire, Basic, Pittsburgh ..	4.50	4.50	4.50	4.15	2.60
Nails, Wire, Pittsburgh ..	5.30	5.30	5.30	5.20	2.80
Tin plate, box, Pittsburgh.	$7.50	$7.50	$7.50	$7.75	$5.00

SEMIFINISHED

Billets, forging, Pitts.(NT)	$63.00	$63.00	$63.00	$61.00	$40.00
Sheet bar, mill (NT)	57.00–58.00	57.00–58.00	57.00–58.00	67.00	34.00
Wire rods, ½-⅝", Pitts...	3.85	3.85	3.85	3.775	2.00

PIG IRON, Gross Ton

Bessemer, Pitts.	$47.00	$47.00	$47.00	$48.08	$26.19
Basic, Valley	46.00	46.00	46.00	46.00	24.50
Basic, del. Phila.	49.44	49.44	49.44	50.30	26.34
No. 2 Fdry, Pitts.	46.50	46.50	46.50	47.58	25.69
No. 2 Fdry, Chicago	46.50	46.50	46.50	46.25	25.00
No. 2 Fdry, Valley	46.50	46.50	46.50	46.50	25.00
No. 2 Fdry, del. Phila. ...	49.94	49.94	49.94	50.80	26.84
No. 2 Fdry, Birm.	42.38	42.38	42.38	43.38	21.38
No. 2 Fdry. (Birm.)del.Cin.	49.08	49.08	49.08	49.43	25.06
Malleable, Valley	46.50	46.50	46.50	46.50	25.00
Malleable, Chicago	46.50	46.50	46.50	46.50	25.00
Charcoal, Lyles, Tenn. ...	60.00	60.00	60.00	66.00	33.00
Ferromanganese, Etna, Pa.	175.00	175.00	175.00	163,00	140.33*

* Delivered, Pittsburgh.

SCRAP, Gross Ton

No. 1 Heavy Melt. Pitts...	$32.25	$32.00	$31.00	$32.50	$20.00
No. 1 Heavy Melt. E. Pa..	25.25	25.25	23.50	27.50	18.75
No. 1 Heavy Melt. Chicago	29.00	29.00	28.00	31.00	18.75
No. 1 Heavy Melt. Valley..	32.75	32.75	31.75	29.25	20.00
No. 1 Heavy Melt. Cleve. .	29.25	29.25	28.25	28.25	19.50
No. 1 Heavy Melt. Buffalo	29.75	28.25	28.25	30.50	19.25
Rails, Rerolling, Chicago..	46.50	45.50	44.50	39.50	22.25
No. 1 Cast, Chicago	41.00	42.50	41.00	34.50	20.00

COKE, Net Ton

Beehive, Furn., Connlsvl...	$14.25	$14.25	$13.25	$14.50	$7.00
Beehive, Fdry., Connlsvl...	16.00	16.00	15.50	17.00	7.75
Oven Fdry., Chicago	21.00	21.00	21.00	20.40	13.35

NONFERROUS METALS

Copper, del. Conn.	18.50	18.50	18.50	23.375	12.00
Zinc, E. St. Louis	10.50	10.25	9.75	15.00	8.25
Lead, St. Louis	10.30	10.30	11.80	14.825	6.35
Tin, New York	75.375	75.25	74.625	103.00	52.00
Aluminum, del.	17.00	17.00	17.00	17.00	15.00
Antimony, Laredo, Tex. ..	24.50	24.50	24.50	38.50	15.00
Nickel, refinery, duty paid.	40.00	40.00	40.00	40.00	35.00

Pig Iron

For key to producing companies, turn next page.
Minimum delivered prices do not include 3% federal tax.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$48.00	$48.50	$49.00	$49.50
Newark,del.	50.63	51.13	51.63	52.13
Brooklyn,N.Y.,del.	....	52.79	53.29	....
Birmingham District				
Birmingham R2	41.88	42.38	....	....
Birmingham S9	41.88	42.38	....	....
Woodward,Ala. W15	41.88	42.38	....	....
Cincinnati,del.	....	49.08	....	....
Buffalo District				
Buffalo H1, R2	46.00	46.50	47.00	....
Tonawanda,N.Y., W12	46.00	46.50	47.00	....
N.Tonawanda,N.Y., T9	....	46.50	47.00	....
Boston, del.	55.26	55.76	56.20	....
Rochester,N.Y.,del.	48.63	49.13	49.63	....
Syracuse,N.Y.,del.	49.58	50.08	50.58	....
Chicago District				
Chicago I-3	46.00	46.50	46.50	47.00
Gary,Ind. C3	46.00	....	46.50	....
IndianaHarbor,Ind. I-2	46.00	....	46.50	....
So.Chicago,Ill. W14 Y1	46.00	46.50	46.50	....
So.Chicago,Ill. C3	46.00	....	46.50	47.00
Milwaukee, del.	47.89	48.39	48.39	48.89
Muskegon,Mich.,del.	....	51.98	51.98	....
Cleveland District				
Cleveland A7	46.00	46.50	46.50	47.00
Cleveland R2	46.00	46.50	46.50	....
Akron,del. from Cleve.	48.39	48.89	48.89	49.39
Lorain,O. N3	46.00	....	....	47.00
Duluth I-3	....	....	46.50	....
Erie,Pa. I-3	46.00	46.50	46.50	47.00
Everett,Mass. E1	....	50.50	51.00	....
Fontana,Calif. K1	52.00	52.50	....	....
Geneva,Utah G1	46.00	46.50	....	....
Seattle,Tacoma,Wash.,del.	....	54.20	....	....
Portland,Oreg.,del.	....	54.20	....	....
LosAngeles,SanFrancisco,del. ...	53.70	54.20	....	....
GraniteCity,Ill. M10	47.90	48.40	48.90	....
St.Louis,del. (incl. tax).....	48.65	49.15	49.65	....
Ironton, Utah C11	46.00	46.50	....	....
Minnequa,Colo. C10	47.00	47.50	47.50	....
Pittsburgh District				
NevilleIsland,Pa. P6	46.00	46.50	46.50	47.00
Pitts,N.&S. sides, Ambridge, Aliquippa,del.	47.19	47.69	47.69	48.19
McKeesRocks,del.	46.95	47.45	47.45	47.95
Lawrenceville,Homestead, McKeesport,Monaca,del.	47.44	47.94	47.94	48.44
Verona,del.	47.90	48.40	48.40	48.90
Brackenridge,del.	48.13	48.63	48.63	49.13
Bessemer,Pa. C3	46.00	....	46.50	47.00
Clairton,Rankin,So.Duquesne,Pa. C3	46.00	....	....	....
McKeesport,Pa. N3	46.00	....	....	47.00
Sharpsville,Pa. S6	46.00	46.50	46.50	47.00
Steelton,Pa. B2	48.00	48.50	49.00	49.50
Steubenville, O. W10	46.00	....	....	....
Struthers,O. S16	46.00	....	....	....
Swedeland,Pa. A3	48.00	48.50	49.00	49.50
Philadelphia,del.	49.44	49.94	50.44	50.94
Toledo,O. I-3	46.00	46.50	46.50	47.00
Cincinnati,del.	51.01	51.51	....	....
Troy,N.Y., R2	48.00	48.50	49.00	49.50
Youngstown District				
Hubbard,O. Y1	46.00	46.50	46.50	....
Youngstown C3	46.00	....	....	47.00
Youngstown Y1	46.00	46.50	46.50	47.00
Mansfield,O. del.	50.26	50.76	50.76	51.26

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%.

Phosphorous: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1%, or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si to 11.50%)

Jackson,O. G2, J1	$57.00
Buffalo H1	58.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for 0.045% max. P)

NiagaraFalls,N.Y. P15	$71.50
Keokuk,Iowa, Openhearth & Fdry, frt. allowed K2	77.00
Keokuk, Iowa, OH & Fdry., 12½ lb. piglets, frt. allowed K2.	82.00
Wenatchee, Wash., OH & Fdry, frt. allowed K2	77.00

CHARCOAL PIG IRON, Gross Ton

(Low phos. semi-cold blast; differential charged from silicon over base grade; also for hard chilling iron Nos. 5 x 6)

LylesTenn. T3	$60.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$51.00
Steelton,Pa. B2	54.00
Philadelphia delivered	57.00
Troy,N.Y. R2	54.00

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Semifinished and Finished Steel Products

Mill prices as reported to STEEL, Apr. 6, 1950; cents per pound unless otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Detroit R7 ..... $50.00
Munhall,Pa. C3 ..... 50.00

INGOTS, Alloy (NT)
Detroit R7 ..... $51.00
Houston,Tex. S5 ..... 59.00
Midland,Pa. C18 ..... 51.00
Munhall,Pa. C3 ..... 51.00
SoDuquesne,Pa. C3 ..51.00

BILLETS, BLOOMS & Slabs Carbon, Rerolling (NT)
Bessemer,Pa. C3 ....$53.00
Clairton,Pa. C3 ..... 53.00
Conshohocken,Pa. A3 .58.00
Ensley,Ala. T2 ..... 53.00
Fairfield,Ala. T2 ..... 53.00
Fontana,Cal. K1 ..... 72.00
Gary,Ind. C3 ..... 53.00
Johnstown,Pa. B2 ..... 53.00
Lackawanna,N.Y. B2..53.00
Munhall,Pa. C3 ..... 53.00
Sharon,Pa. S3 ..... 57.00
SoChicago,Ill. C3 ..... 53.00
So.Duquesne,Pa. C3 ..53.00

Carbon, Forging (NT)
Bessemer,Pa. C3 ....$63.00
Buffalo R2 ..... 63.00
Canton,O. R2 ..... 63.00
Clairton,Pa. C3 ..... 63.00
Cleveland R2 ..... 63.00
Conshohocken,Pa. A3..65.00
Detroit R7 ..... 63.00
Ensley,Ala. T2 ..... 63.00
Fairfield,Ala. T2 ..... 63.00
Fontana,Calif. K1 ....85.00
Gary,Ind. C3 ..... 63.00
Geneva, Utah G1 ..... 63.00
Houston,Tex. S5 ..... 71.00
Ind.Harbor,Ind. I-2 ...63.00
Johnstown,Pa. B2 ....63.00
Lackawanna,N.Y. B2 ..63.00
Los Angeles B3 ..... 82.00
Munhall,Pa. C3 ..... 63.00
Seattle B3 ..... 82.00
So.Chicago C3,R2,W14.63.00
So.Duquesne,Pa. C3 ...63.00
So.SanFrancisco B3 ...82.00
Warren,O. C17 ..... 63.00

Alloy (NT)
Bethlehem,Pa. B2 ....$66.00
Buffalo R2 ..... 66.00
Canton,O. R2, T7 ....66.00
Conshohocken,Pa. A3..68.00
Detroit R7 ..... 66.00
Fontana,Calif. K1 ....85.00
Gary,Ind. C3 ..... 66.00
Houston,Tex. S5 ..... 74.00
Ind.Harbor,Ind. Y1 ...66.00
Johnstown,Pa. B2 ....66.00
Lackawanna,N.Y. B2 ..66.00
LosAngeles B3 ..... 86.00
Massillon,O. R2 ..... 66.00
Midland,Pa. C18 ..... 66.00
Munhall,Pa. C3 ..... 66.00
Sharon,Pa. S3 ..... 66.00
So.Chicago C3,R2,W14.66.00
So.Duquesne,Pa. C3 ...66.00
Warren,O. C17 ..... 66.00
Youngstown Y1 ..... 66.00

SHEETS BARS (NT)
Mansfield,O. E6 .....$58.00
Sharon,Pa. S3 ..... 57.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 .....$76.00
Cleveland R2 ..... 76.00
Ind.Harbor, Ind. I-2 ...76.00
Massillon,O. R2 ..... 76.00
So.Chicago,Ill R2 ....76.00

SKELP
Aliquippa,Pa. J5 ..... 3.25
Munhall,Pa. C3 ..... 3.15
Warren,O. R2 ..... 3.15
Youngstown C3, R2 ...3.15

WIRE RODS
AlabamaCity,Ala. R2 ..3.85
Buffalo W12 ..... 3.85
Cleveland A7 ..... 3.85
Donora,Pa. A7 ..... 3.85
Fairfield,Ala. T2 ..... 3.85
Houston,Tex. S5 ..... 4.25
Ind.Harbor,Ind. Y1 ...3.85
Johnstown,Pa. B2 ..... 3.85
Joliet,Ill. A7 ..... 3.85
LosAngeles B3 ..... 4.65
Minnequa,Colo. C10 ...4.10
Monessen,Pa. P7 ..... 3.85
No.Tonawanda,N.Y. B11.4.10
Pittsburg,Calif. C11 ...4.50
Portsmouth,O. P12 ....3.85
Roebling,N.J. R5 ..... 3.95
So.Chicago,Ill. R2 ..... 3.85
SparrowsPoint B2 ..... 3.95
Sterling,Ill.(1) N15 ....3.85
Struthers,O. Y1 ..... 3.85
Torrance,Calif. C11 ....4.65

STRUCTURALS
Carbon Steel Stand. Shapes
Aliquippa,Pa. J5 ..... 3.40
Bessemer,Ala. T2 ..... 3.40
Bethlehem,Pa. B2 ..... 3.45
Clairton,Pa. C3 ..... 3.40
Fairfield,Ala. T2 ..... 3.40
Fontana,Calif. K1 ..... 4.00
Gary,Ind. C3 ..... 3.40
Geneva,Utah G1 ..... 3.40
Houston, Tex. S5 ..... 3.80
Ind.Harbor,Ind. I-2 ...3.40
Johnstown,Pa. B2 ..... 3.45
KansasCity,Mo. S5 .... 4.00
Lackawanna,N.Y. B2 ...3.45
Los Angeles B3 ..... 4.00
Minnequa,Colo. C10 ...3.75
Munhall,Pa. C3 ..... 3.40
Niles,Calif.(22) P1 .... 4.02
Phoenixville,Pa. P4 ....3.30
Portland,Oreg. O4 ..... 3.90
Seattle B3 ..... 4.05
So.Chicago,Ill. C3, W14.3.40
So.SanFrancisco B3 ...3.95
Torrance,Calif. C11 ...4.00
Weirton,W.Va. W6 .... 3.40

Alloy Stand. Shapes
Clairton,Pa. C3 ..... 4.05
Fontana,Calif. K1 ..... 5.25
Munhall,Pa. C3 ..... 4.05
So.Chicago,Ill. C3 ..... 4.05

H.-S. Low-Alloy Stand. Shapes
Aliquippa,Pa. J5 ..... 5.15
Bessemer,Ala. T2 ..... 5.15
Bethlehem,Pa.(14) B2..5.20
Clairton,Pa. C3 ..... 5.15
Fairfield,Ala. T2 ..... 5.15
Fontana,Calif. K1 ..... 5.75
Gary,Ind. C3 ..... 5.15
Ind.Harbor,Ind. I-2, Y1.5.15
Johnstown,Pa. B2 ..... 5.20
Lackawanna,N.Y.(14)B2 5.20
Munhall,Pa. C3 ..... 5.15
So.Chicago,Ill. C3 ..... 5.15
Struthers,O. Y1 ..... 5.15

Wide Flange
Bethlehem,Pa. B2 ..... 3.45
Lackawanna,N.Y. B2 ..3.45
Munhall,Pa. C3 ..... 3.40
So.Chicago,Ill. C3 ..... 3.40

H.-S., L-A Wide Flange
Munhall,Pa. C3 ..... 5.10
So.Chicago,Ill. C3 ..... 5.10

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ...4.20
Lackawanna,N.Y. B2 ..4.20
Munhall,Pa. C3 ..... 4.20
So.Chicago,Ill. C3 ..... 4.20
Weirton,W.Va. W6 .... 4.20

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..3.50
Aliquippa,Pa. J5 ..... 3.50
Ashland,Ky.(15) A10 ..3.50
Bessemer,Ala. T2 ..... 3.50
Clairton,Pa. C3 ..... 3.50
Claymont,Del. W16 .... 3.60
Cleveland J5, R2 ..... 3.50
Coatesville,Pa. L7 ..... 3.60
Conshohocken,Pa. A3 ..3.60
Ecorse,Mich. G5 ..... 3.75
Fairfield,Ala. T2 ..... 3.50
Fontana,Calif. K1 ..... 4.10
Gary,Ind. C3 ..... 3.50
Geneva,Utah G1 ..... 3.50
Harrisburg,Pa. C5 ..... 3.50
Houston,Tex. S5 ..... 3.90
Ind.Harbor,Ind. I-2, Y1.3.50
Johnstown,Pa. B2 ..... 3.50
Lackawanna,N.Y. B2 ..3.50
Minnequa,Colo. C10 .... 4.30
Munhall,Pa. C3 ..... 3.50
Pittsburgh J5 ..... 3.50
Seattle B3 ..... 4.40
Sharon,Pa. S3 ..... 3.50
So.Chicago,Ill. C3, W14.3.50
SparrowsPoint,Md. B2..3.50
Steubenville,O. W10 ...3.50
Warren,O. R2 ..... 3.50
Weirton,W.Va. W6 .... 3.50
Youngstown C3, R2, Y1.3.50

PLATES (Universal Mill)
Fontana,Calf. K1 .... 4.40

PLATES, Carbon A.R.
Fontana,Calif. K1 ..... 5.25

PLATES, Open-Hearth Alloy
Coatesville,Pa. L7 ..... 4.50
Conshohocken,Pa. A3 ..4.40
Fontana,Calif. K1 ..... 5.40
Gary,Ind. C3 ..... 4.40
Johnstown, Pa. B2 ..... 4.40
Munhall,Pa. C3 ..... 4.40
Sharon,Pa. S3 ..... 4.40
So.Chicago,Ill. C3 ..... 4.40
SparrowsPoint,Md. B2..4.40

PLATES, Wrought Iron
Economy,Pa. B14 ..... 7.85

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 ..... 5.35
Bessemer,Ala. T2 ..... 5.35
Clairton,Pa. C3 ..... 5.35
Cleveland J5, R2 ..... 5.35
Conshohocken,Pa. A3 ..5.35
Ecorse,Mich. G5 ..... 5.60
Fairfield,Ala. T2 ..... 5.35
Fontana,Calif. K1 ..... 5.95
Gary,Ind. C3 ..... 5.35
Geneva,Utah G1 ..... 5.35
Houston,Tex. S5 ..... 5.60
Ind.Harbor,Ind. I-2, Y1.5.35
Johnstown,Pa. B2 ..... 5.35
Munhall,Pa. C3 ..... 5.35
Pittsburgh J5 ..... 5.35
Sharon,Pa. S3 ..... 5.35
So.Chicago,Ill. C3 ..... 5.35
SporrowsPoint,Md. B2 ..5.35
Warren,O. R2 ..... 5.35
Youngstown Y1 ..... 5.35

FLOOR PLATES
Cleveland J5 ..... 4.55
Conshohocken,Pa. A3 ..4.55
Harrisburg,Pa. C5 ..... 4.55
Ind.Harbor,Ind. I-2 ....4.55
Munhall,Pa. C3 ..... 4.55
So.Chicago,Ill. C3 ..... 4.55

PLATES, Ingot Iron
Ashland,c.l. (15) A10 ..3.75
Ashland,l.c.l(15) A10 ..4.25
Cleveland,cl R2 ..... 4.10
Warren,O. cl R2 ..... 4.10

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ..3.45
Aliquippa,Pa. J5 ..... 3.45
Alton,Ill.(1) L1 ..... 3.45
Ashland,Ky.(17) A10 ..3.45
Atlanta,Ga. A11 ..... 3.60
Bessemer,Ala. T2 ..... 3.45
Buffalo R2 ..... 3.45
Canton,O. R2 ..... 3.45
Clairton,Pa. C3 ..... 3.45
Cleveland R2 ..... 3.45
Ecorse,Mich. G5 ..... 3.65
Emeryville,Calif. J7 .... 4.20
Fairfield,Ala. T2 ..... 3.45
Fontana,Calif. K1 ..... 4.10
Gary,Ind. G3 ..... 3.45
Houston,Tex. S5 ..... 3.85
Ind.Harbor,Ind. I-2, Y1..3.45
Johnstown,Pa. B2 ..... 3.45
KansasCity,Mo. S5 .... 4.05
Lackawanna,N.Y. B2 ..3.45
Los Angeles B3 ..... 4.15
Marion,O. P11 ..... 3.35
Midland,Pa. C18 ..... 3.45
Milton,Pa. B6 ..... 3.45
Minnequa,Colo. C10 ...3.85
Niles,Calif. P1 ..... 4.17
N.Tonawanda,N.Y. B11.3.45
Pittsburg,Calif. C11 ....4.15
Pittsburgh J5 ..... 3.45
Portland,Oreg. O4 ..... 4.20
Seattle B3, N14 ..... 4.20
So.Chicago C3, R2, W14.3.45
So.Duquesne,Pa. C3 ...3.45
S.SanFran.,Cal. B3 .... 4.20
Struthers,O. Y1 ..... 3.45
Torrance,Calif. C11 ....4.15
Weirton,W.Va. W6 .... 3.45
Youngstown C3, R2 ....3.45

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ..... 3.45
Atlanta A11 ..... 3.60
Johnstown,Pa. B2 ..... 3.45
Lackawanna,N.Y. B2 ..3.45
Niles,Calif. P1 ..... 4.17
Pittsburgh(23) J5 ..... 3.45
Portland,Oreg. O4 ..... 4.20
SanFrancisco S7 ..... 4.00
Weirton,W.Va. W6 .... 3.45

BAR SIZE ANGLES; H.R.CARBON
Bethlehem,Pa. B2 ..... 3.65

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ..... 3.95
Buffalo R2 ..... 3.95
Canton,O. R2, T7 ..... 3.95
Clairton,Pa. C3 ..... 3.95
Ecorse,Mich. G5 ..... 4.25
Fontana,Calif. K1 ..... 4.95
Gary,Ind. C3 ..... 3.95
Houston,Tex. S5 ..... 4.35
Ind.Harbor,Ind. I-2, Y1.3.95
Johnstown,Pa. B2 ..... 3.95
KansasCity,Mo. S5 .... 4.55
Lackawanna,N.Y. B2 ..3.95
Los Angeles B3 ..... 5.00
Massillon,O. R2 ..... 3.95
Midland,Pa. C18 ..... 3.95
So.Chicago C3, R2, W14.3.95
So.Duquesne,Pa. C3 ...3.95
Struthers,O. Y1 ..... 3.95
Warren,O. C17 ..... 3.95
Youngstown C3 ..... 3.95

BARS, Hot-Rolled Ingot Iron
Ashland,Ky.(17) A10 ..3.70

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ..... 5.20
Bessemer,Ala. T2 ..... 5.20
Bethlehem,Pa. B2 ..... 5.20
Clairton,Pa. C3 ..... 5.20
Cleveland R2 ..... 5.20
Ecorse,Mich. G5 ..... 5.40
Fairfield,Ala. T2 ..... 5.20
Fontana,Calif. K1 .... 6.25
Gary,Ind. C3 ..... 5.20
Ind.Harbor,Ind. I-2, Y1.5.20
Johnstown,Pa. B2 ..... 5.20
Lackawanna,N.Y. B2 ..5.20
Pittsburgh J5 ..... 5.20
So.Duquesne,Pa. C3 ...5.20
Struthers,O. Y1 ..... 5.20
Youngstown C3 ..... 5.20

BARS, Cold-Finished Carbon
Aliquippa,Pa. K5 ..... 4.15
Ambridge,Pa. W18 .... 4.15
BeaverFalls,Pa. M12,R2.4.15
Buffalo B5 ..... 4.15
Camden,N.J. P13 ..... 4.63
Carnegie,Pa. C12 ..... 4.15
Chicago W18 ..... 4.15
Cleveland A7, C20 ..... 4.15
Detroit P17 ..... 4.30
Donora,Pa. A7 ..... 4.15
Ecorse,Mich. G5 ..... 4.35
Elyria,O. W8 ..... 4.15
FranklinPark,Ill. N5 ..4.15
Gary,Ind. R2 ..... 4.15
Hammond,Ind. L2, M13.4.15
Hartford,Conn. R2 .... 4.55
Harvey,Ill. B5 ..... 4.15
LosAngeles R2 ..... 5.55
Mansfield,Mass. B5 .... 4.55
Massillon,O. R2, R8 ...4.15
Midland,Pa. C18 ..... 4.15
Monaca,Pa. S17 ..... 4.15
Newark,N.J. W18 ..... 4.55
Plymouth,Mich. P5 .... 4.40
Pittsburg J5 ..... 4.10
Putnam,Conn. W18 .... 4.55
Readville,Mass. C14 .... 4.55
St.Louis,Mo. M5 ..... 4.55
So.Chicago,Ill. W14 .... 4.15
SpringCity,Pa.(5) K3 ..4.55
Struthers,O. Y1 ..... 4.15
Waukegan,Ill. A7 ..... 4.15
Youngstown F3, Y1 .... 4.15

BARS, Cold-Finished Alloy
Aliquippa,Pa. K5 ..... 4.90
Ambridge,Pa. W18 .... 4.90
BeaverFalls,Pa. M12 ..4.90
Bethlehem,Pa. B2 ..... 4.90
Buffalo B5 ..... 4.90
Canton,O. R2, T7 ..... 4.90
Carnegie,Pa. C12 ..... 4.90
Chicago W18 ..... 4.90
Cleveland A7, C20 ..... 4.90
Detroit P17 ..... 5.05
Donora,Pa. A7 ..... 4.90
Elyria,O. W8 ..... 4.90
Gary,Ind. R2 ..... 4.90
Hammond,Ind. L2, M13.4.90
Hartford,Conn. R2 .... 5.20
Harvey,Ill. B5 ..... 4.90
Lackawanna,N.Y. B2 ..4.90
Mansfield,Mass. B5 .... 5.20
Massillon,O. R2, R8 ...4.90
Midland,Pa. C18 ..... 4.90
Monaca,Pa. S17 ..... 4.90
Newark,N.J. W18 ..... 5.20
Plymouth,Mich. P5 ..... 5.10
So.Chicago,Ill. R2, W14.4.90
Struthers,O. Y1 ..... 4.90
Waukegan,Ill. A7 ..... 4.90
Warren,O. C17 ..... 4.90
Worcester,Mass. A7 .... 5.20
Youngstown F3, Y1 ..... 4.90

RAIL STEEL BARS
ChicagoHts.,Ill.(3) I-2..3.30
ChicagoHts.,Ill.(4) I-2..3.45
FortWorth,Tex.(26) T4..4.33
Huntngtn,W.Va.(3) W7..3.45
Moline,Ill.(3) R2 ..... 3.40
SouthAvis,Pa.(2) J8 ... 3.30
SouthAvis,Pa.(41) J8 ..3.30
SouthAvis,Pa.(42) J8 ..3.30
Williamsport(2,3) S19 ..3.45

BARS, Wrought Iron
Economy,Pa.(S.R.) B14.9.50
Economy,Pa.(D.R.)B14 11.00
Economy,(Staybolt)B14 11.30
Dover,N.J.(Staybolt)U1 15.00
Dover(Eng. Bolt) U1 ..13.50
Dover(Wrgt,Iron) U1 .12.25
McK.Rks.(S.R.) L5 ....8.60
McK.Rks.(D.R.) L5 ...11.25
McK.Rks.(Staybolt) L5.12.75

BARS, Reinforcing
(Fabricated; to Consumers)
Huntington,W.Va. W7 ..4.50
Johnstown, ¼-1" B2 ..4.35
Los Angeles B3 ..... 5.00
Marion,O. P11 ..... 4.25
Seattle B3, N14 ..... 5.10
SouthAvis,Pa. J8 ..... 4.35
So.SanFrancisco B3 ...5.00
SparrowsPt., ¼-1" B2 ..4.35
Williamsport,Pa. S19 ..4.35

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..3.45
Alton,Ill.(6) L1 ..... 3.45
Atlanta,Ga. A11 ..... 3.60
Buffalo R2 ..... 3.45
Cleveland R2 ..... 3.45
Emeryville,Calif. J7 ...4.20
Fairfield,Ala. T2 ..... 3.45
Fontana,Calif. K1 ..... 4.10
Gary,Ind. C3 ..... 3.45
Houston,Tex. S5 ..... 3.85
Ind.Harbor,Ind. I-2,Y1.3.45
Johnstown,Pa. B2 ..... 3.45
KansasCity,Mo. S5 ..... 4.05
Lackawanna,N.Y. B2 ..3.45
Los Angeles B3 ..... 4.15
Milton,Pa. B6 ..... 3.45
Minnequa,Colo. C10 ...4.25
Niles,Calif. P1 ..... 4.17
Pittsburg,Calif. C11 .... 4.15
Pittsburgh J5 ..... 3.45
Portland,Oreg. O4 ..... 4.20
SandSprings,Okla. S5 ..4.35
Seattle,Wash. B3, N14..4.20
SouthAvis,Pa. J8 ..... 3.45
So.Chicago,Ill. R2 ..... 3.45
So.Duquesne,Pa. C3 .... 3.45
So.SanFrancisco B3 .... 4.20
SparrowsPoint,Md. B2 ..3.45
Struthers,O. Y1 ..... 3.45
Torrance,Calif. C11 .... 4.15
Youngstown C3, R2 .... 3.45

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. C3 ..... 4.20
Fontana,Calif. K1 ..... 4.95
Gary,Ind. C3 ..... 4.20
Youngstown C3 ..... 4.20

SHEETS, Hot-Rolled Steel (18 gage and heavier)
AlabamaCity,Ala. R2 ..3.35
Ashland,Ky.(8) A10 ...3.35
Butler,Pa. A10 ..... 3.35
Cleveland J5, R2 ..... 3.35
Conshohocken,Pa. A3 ..3.45
Ecorse,Mich.(8) G5 .... 3.55
Fairfield,Ala. T2 ..... 3.35
Fontana,Calif. K1 ..... 4.25
Gary,Ind. C3 ..... 3.35
Ind.Harbor,Ind. I-2, Y1.3.35
Irvin,Pa. C3 ..... 3.35
Lackawanna,N.Y. B2 ..3.35
Munhall,Pa. C3 ..... 3.35
Niles,O. N12 ..... 3.50
Niles,O. M4 ..... 3.75
Pittsburg,Calif. C11 ....4.05
Pittsburgh J5 ..... 3.35
Sharon,Pa. S3 ..... 3.35
So.Chicago,Ill. W14 .... 3.35
SparrowsPoint,Md. B2 ..3.35
Steubenville,O. W10 ...3.35
Torrance,Calif. C11 ....4.05
Warren,O. R2 ..... 3.35
Weirton,W.Va. W6 .... 3.35
Youngstown C3, Y1 .... 3.35

SHEETS, Hot-Rolled Carbon Steel (19 gage and lighter)
AlabamaCity,Ala. R2 ..4.50
Dover,O. R1 ..... 4.65
Ind.Harbor,Ind. I-2 .... 4.40
Mansfield,O. E6 ..... 4.15
Niles,O. N12 ..... 4.10
Niles,O. M4 ..... 4.65
Torrance,Calif. C11 ....5.15

SHEETS, H-R (14 ga., heavier) High-Strength Low-Alloy
Cleveland J5, R2 ..... 5.05
Conshohocken,Pa. A3 ..5.05
Ecorse,Mich. G5 ..... 5.25
Fairfield,Ala. T2 ..... 5.05
Fontana,Calf. K1 .... 6.74
Gary,Ind. C3 ..... 5.05
Ind.Harbor,Ind. I-2, Y1.5.05
Irvin,Pa. C3 ..... 5.05
Lackawanna(35) B2 ...5.05
Pittsburgh J5 ..... 5.05
Sharon,Pa. S3 ..... 5.05
So.Chicago,Ill. C2 ..... 5.05
SparrowsPoint(36) B2 ..5.05
Warren,O. R2 ..... 5.05
Weirton,W.Va. W6 .... 5.05
Youngstown, C3, Y1 ...5.05

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 ..... 6.20
Ecorse,Mich. G5 ..... 6.40
Fontana,Calif. K1 ..... 7.05
Gary,Ind. C3 ..... 6.20
Ind.Harbor,Ind. I-2, Y1.6.20
Irvin,Pa. C3 ..... 6.20
Lackawanna(37) B2 ...6.20
Pittsburgh J5 ..... 6.20
Sharon,Pa. S3 ..... 6.20
SparrowsPoint(38) B2 ..6.20
Warren,O. R2 ..... 6.20
Weirton,W.Va. W6 .... 6.20
Youngstown Y1 ..... 6.20

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10 .....4.10
Cleveland J5, R2 .....4.10
Ecorse,Mich. G5 .....4.30
Fairfield,Ala. T2 .....4.10
Follansbee,W.Va. F4 ..4.10
Fontana,Calif. K1 .....5.00
Gary,Ind. C3 .....4.10
GraniteCity,Ill. G4 ....4.30
Ind.Harbor,Ind. I-2, Y1.4.10
Irvin,Pa. C3 .....4.10
Lackawanna,N.Y. B2 ..4.10
Middletown,O. A10 ....4.10
Pittsburg,Calif. C11 ....5.05
Pittsburgh J5 .....4.10
SparrowsPoint,Md. B2 ..4.10
Steubenville,O. W10 ....4.10
Warren,O. R2 .....4.10
Weirton,W.Va. W6 .....4.10
Youngstown Y1 .....4.10

SHEETS, Gal'zd No. 10 Steel

AlabamaCity,Ala. R2 ..4.40
Ashland,Ky.(8) A10 ....4.40
Canton,O. R2 .....4.40
Delphos,O. N16 .....5.15
Dover,O. R1 .....4.75
Fairfield,Ala. T2 .....4.40
Gary,Ind. C3 .....4.40
GraniteCity,Ill. G4 ....4.60
Ind.Harbor,Ind. I-2 ....4.40
Irvin,Pa. C3 .....4.40
Kokomo,Ind. C16 .....4.50
MartinsFerry,O. W10 ..4.40
Niles,O. N12 .....4.65
Pittsburg,Calif. C11 ....5.15
SparrowsPoint,Md. B2 ..4.40
Steubenville,O. W10 ....4.40
Torrance,Calif. C11 ....5.15
Weirton,W.Va. W6 ....4.40

SHEETS, Galvanized No. 10, High-Strength Low Alloy

Irvin,Pa. C3 .....6.75
SparrowsPoint(39) B2 ..6.75

SHEETS, Galvannealed Steel

Canton,O. R2 .....4.95
Irvin,Pa. C3 .....4.95
Kokomo,Ind. C16 .....5.05
Niles,O. N12 .....5.20

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10 .....4.65
Middletown,O. A10 ....4.65

SHEETS, Electro Galvanized

Cleveland R2 (28) 5.25
Niles,O. R2 (28) 5.25
Weirton,W.Va. W6 ....5.10

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2 ....5.05

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va. W10 4.80
Gary,Ind. C3 .....4.80
Mansfield,O. E6 .....4.80
Middletown,O. A10 ....4.80
Niles,O. N12 .....4.80
Weirton,W.Va. W6 ....4.80

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....5.20

ROOFING SHORT TERNES (Package; 8 lb coated)

Gary,Ind. C3 .....$17.50
Yorkville, O. W10 ....17.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2 ....$6.60
Gary,Ind. C3 .....6.50
Ind.Harbor I-2 .....6.50
Irvin,Pa. C3 .....6.50
Yorkville,O. W10 .....6.50

SHEETS, Lt. Coated Ternes, 6 lb

Yorkville, O. W10 .... $7.05

SHEETS, Mfg. Ternes, 8 lb

Gary,Ind. C3 .....$8.10
Warren,O. R2 .....8.10
Yorkville,O. W-10 .....8.10

SHEETS, Coated Ternes, 12 lb

Yorkville,O. W10 .....8.95

SHEETS, Culvert, No. 16	Cu Alloy	Cu Fe
Ashland A10	5.20	...
Canton,O. R2 ..	5.25	5.70
Fairfield,Ala. T2.	5.20	5.45
Gary C3	5.20	5.45
IndianaHarbor I-2	5.20	5.45
Irvin,Pa. C3 ...	5.20	5.45
Kokomo C16	5.40	...
MartinsFy,O. W10	5.20	5.45
Pittsburg,Cal. C11	5.95	...
SparrowsPt. B2 .	5.20	...
Torrance,Cal. C11	5.95	...

SHEETS, Culvert, No. 16 Corrugated Ingot Iron

Ashland,Ky. A10 .....5.45

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10 ...3.60
Cleveland R2 .....3.95
Ind.Harbor,Ind. I-2 ....3.60
Warren,O. R2 .....3.95

SHEETS, Cold-Rolled Ingot Iron

Cleveland R-2 .....4.70
Middletown,O. A10 ....4.60
Warren,O. R2 .....4.70

SHEETS, Galvanized Ingot Iron No. 10 Flat

Ashland,Ky.(8) A10 ....4.65
Canton,O. R2 .....5.15
Ind.Harbor,Ind. I-2 ...4.80

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10 .....4.90
Middletown,O. A10 ....4.90

SHEETS, Well Casing

Torrance,Calif. C11 ....4.85

SHEETS, Drum Body

Pittsburg,Calif. C11 ....4.05
Torrance,Calif. C11 ....4.05

SHEETS, Aluminized

Butler,Pa. A10 .....7.75

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$6.35	$6.60	$6.85
Fairfield,Ala. T2	6.45	6.70	6.95
Gary,Ind. C3	6.35	6.60	6.85
GraniteCity,Ill. G4	6.55	6.80	7.05
Ind.Harbor,Ind. I-2, Y1	6.35	6.60	6.85
Irvin,Pa. C3	6.35	6.60	6.85
Niles,O. R2	6.35	6.60	6.85
Pittsburg,Calif. C11	7.10	7.35	7.60
SparrowsPoint,Md. B2	6.45	6.70	6.95
Weirton,W.Va. W6	6.35	6.60	6.85
Yorkville,O. W10	6.35	6.60	6.85

SHEETS, SILICON, H.R. or C.R. (22 Ga.) Coils (Cut Lengths ½c lower)	Arma- Field	ture	Elec- tric	Motor	Dyna- mo
BeechBottom W10 (cut lengths)	...	...	6.70	7.95	8.75
Brackenridge,Pa. A4	...	...	7.20	8.45	9.25
GraniteCity,Ill. G4(cut lengths)	...	...	6.90	8.15	...
Ind.Harbor,Ind. I-2	6.40	6.70	(34)	...	...
Mansfield,O. E6 (cut lengths)	5.90	6.20	6.70	7.95	8.75
Niles,O. N12 (cut lengths)	...	6.20	6.70	...	...
Niles,O. M4 (24 Gage)	5.65	5.95	6.45	...	...
Parkersburg F4 (cut lengths).	...	...	6.70	7.95	8.75
Vandergrift,Pa. C3	...	6.70	7.20	8.45	9.25
Warren,O. R2	6.40	6.70	7.20	8.45	9.25
Zanesville,O. A10	...	6.70	7.20	8.45	9.25

SHEETS, SILICON (22 Gage Base) Coils (Cut Lengths ½c lower)

Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.30	9.85	10.55	11.35
Brackenridge,Pa. A4	9.80	10.35	11.05	....
Parkersburg F4 (cut lengths) .	9.30	....	....	....
Vandergrift,Pa. C3	9.80	10.35	11.05	11.85
Warren,O. R2	9.80	....	....	....
Zanesville,O. A10	9.80	10.35	11.05	11.85

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Vandergrift,Pa. C3	12.35	13.20	14.20	14.70

TIN PLATE, American COKE (Base Box)	1.25 lb	1.50 lb
Aliquippa J5	$7.30	$7.50
Fairfield,Ala. T2.	7.40	7.60
Gary C3	7.30	7.50
Gran.City,Ill. G4.	7.50	7.70
Ind.Harbor I-1, Y1	7.30	7.50
Irvin,Pa. C3	7.30	7.50
Pitts.Cal. C11 ..	8.05	8.25
Sp.Pt.,Md. B2	7.40	7.60
Warren R2	7.30	7.50
Weirton W6	7.30	7.50
Yorkville,O. W10.	7.30	7.50

CANMAKING BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$5.60
Fairfield,Ala. T2 .....5.70
Gary,Ind. C3 .....5.60
GraniteCity,Ill. G4 ....5.80
Ind.Harbor,Ind. I-2, Y1.5.60
Irvin,Pa. C3 .....5.60
Niles,O. R2 .....5.60
Pittsburg,Calif. C11 ....6.35
SparrowsPoint,Md. B2 ..5.70
Warren,O. R2 .....5.60
Weirton,W. Va. W6 ....5.60
Yorkville,O. W10 .....5.60

HOLLOWARE ENAMELING Black Plate (29 gage)

Aliquippa,Pa. J5 .....5.30
Follansbee,W.Va. F4 ..5.30
Gary,Ind. C3 .....5.30
GraniteCity,Ill. G4 ....5.50
Ind.Harbor,Ind. Y1 ....5.30
Irvin,Pa. C3 .....5.30
Niles,O. R2 .....5.30
SparrowsPoint,Md. B2 ..5.40
Warren,O. R2 .....5.30
Yorkville,O. W10 .....5.30

SHEETS, Enam'lg. Iron

Ashland,Ky.(8) A10 ..4.40
Cleveland R2 .....4.40
Ecorse,Mich. G5 .....4.70
Gary,Ind. C3 .....4.40
GraniteCity,Ill. G4 ....4.60
Ind.Harbor,Ind. I-2 ...4.40
Irvin,Pa. C3 .....4.40
Middletown,O. A10 ....4.40
Niles,O. M4 .....4.90
Youngstown Y1 .....4.40

STRIP, Hot-Rolled, High-Strength Low-Alloy

Bessemer,Ala. T2 .....4.95
Conshohocken,Pa. A3 ..4.95
Ecorse,Mich. G5 .....5.15
Fairfield,Ala. T2 .....4.95
Fontana,Cal. K1 .....6.64
Gary,Ind. C3 .....4.95
Ind.Harb.,Ind. I-2, Y1..4.95
Lackawanna,N.Y. B2 ..4.95
Sharon,Pa. S3 .....4.95
SparrowsPoint, Md. B2..4.95
Warren,O. R2 .....4.95
Weirton,W.Va. W6 ....4.95
Youngstown C3, Y1 ...4.95

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15.5.10
Carnegie,Pa. S18 .....5.10
Fontana,Calif. K1 ....6.30
Gary,Ind. C3 .....5.10
Houston,Tex. S5 .....5.50
KansasCity,Mo. S5 ....5.70
NewBritn,Conn.(10) S15.5.10
Sharon.Pa. S3 .....5.10
Youngstown C3 .....5.10

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ...3.50
Warren,O. R2 .....3.85

STRIP, Hot-Rolled Carbon

Alton,Ill.(1) L1 .....3.25
Ashland,Ky.(8) A10 ...3.25
Atlanta A11 .....3.40
Bessemer,Ala. T2 .....3.25
Bridgeprt,Conn.(10) S15.3.25
Butler,Pa. A10 .....3.25
Carnegie,Pa. S18 .....3.25
Conshohocken,Pa. A3 ..3.35
Detroit M1 .....3.45
Ecorse,Mich. G5 .....3.45
Fairfield,Ala. T2 .....3.25
Fontana,Calif. K1 ....4.40
Gary,Ind. C3 .....3.25
Houston,Tex. S5 .....3.65
Ind.Harbor,Ind. I-2, Y1.3.25
KansasCity,Mo.(9) S5 ..3.85
Lackawanna,N.Y. B2 ..3.25
LosAngeles B3 .....4.00
Milton,Pa. B6 .....3.25
Minnequa,Colo. C10 ....4.30
NewBritain(10) S15 ....3.25
N.Tonawanda,N.Y. B11.3.25
Pittsburg,Calif. C11 ....4.00
Riverdale,Ill. A1 .....3.25
SanFrancisco S7 .....3.90
Seattle B3, N14 .....4.25
Sharon,Pa. S3 .....3.25
So.Chicago,Ill. W14 ....3.25
So.SanFrancisco B3 ...4.00
SparrowsPoint,Md. B2 ..3.25
Torrance,Calif. C11 ....4.00
Warren,O. R2 .....3.25
Weirton,W.Va. W6 ....3.25
WestLeechburg,Pa. A4 ..3.25
Youngstown C3, Y1 ...3.25

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10) S15.9.50
Carnegie,Pa. S18 .....9.50
Cleveland A7 .....9.50
Dover,O. G6 .....9.50
Harrison,N.J. C18 ....9.80
NewBritn,Conn.(10) S15.9.50
Pawtucket,R.I.(11) N8..9.50
Pawtucket,R.I.(12) N8..9.80
Sharon,Pa. S3 .....9.50
Worcester,Mass. A7 ...9.80
Youngstown C8 .....9.50

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....4.75

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6 ..4.15
Berea,O. C7 .....6.60
Bridgprt,Conn.(10) S15.4.15
Butler,Pa. A10 .....4.15
Cleveland A7, J5 .....4.15
Dearborn,Mich. D3 .....4.40
Detroit, D2 .....4.40
Detroit M1 .....4.35
Dover,O.(40) G6 .....4.15
Ecorse,Mich. G5 .....4.35
Follansbee,W.Va. F4 ..4.15
Fontana,Calif. K1 ....5.40
FranklinPark,Ill. T6 ..4.30
Ind.Harbor,Ind. I-2 ....4.30
Lackawanna,N.Y. B2 ..4.15
LosAngeles C1 .....5.50
Mattapan,Mass.(21) T6.4.65
Middletown,O. A10 ....4.15
NewBritain(10) S15 ...4.15
NewCastle,Pa. B4, E5..4.15
NewHaven,Conn. A7, D2.4.65
NewYork W3 .....5.00
Pawtucket,R.I.(11) N8..4.70
Pawtucket,R.I.(21) N8..4.65
Riverdale,Ill. A1 .....4.30
Rome,N.Y. R6 .....4.15
Sharon,Pa.(30) S3 ....4.15
SparrowsPoint,Md. B2 ..4.15
Trenton,N.J. (13) R5 ..4.65
Wallingford,Conn. W2 ..4.65
Warren,O.(25) T5 .....4.15
Warren,O. R2 .....4.15
Weirton,W.Va. W6 ....4.15
Youngstown C8, Y1 ....4.15

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland A7, J5 .....6.20
Dover,O. G6 .....6.20
Ecorse,Mich. G5 .....6.40
Fontana,Calif. K1 ....6.95
Lackawanna,N.Y., B2 ..6.40
Sharon,Pa. S3 .....6.20
SparrowsPoint,Md. B2..6.40
Warren,O. R2 .....6.20
Weirton,W. Va. W6 ....6.20
Youngstown Y1 .....6.20

STRIP, Electro Galvanized

Weirton,W.Va. W6 ....4.15
Youngstown C8 .....4.15

STRIP, Cold-Finished, Spring Steel (Annealed)	0.25-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Bridgeport,Conn.(10) S15	4.15	5.95	6.55	8.50	10.80
Bristol,Conn. W1	...	...	6.40	8.35	....
Carnegie,Pa. S18	...	5.95	6.55	8.50	10.80
Cleveland A7	4.15	5.95	6.55	8.50	10.80
Dover,O. G6	4.15	5.95	6.55	8.50	10.80
FranklinPark,Ill. T6 ..	4.40	6.10	6.70	8.65	....
Harrison,N.J. C18	...	...	6.85	8.80	11.10
Mattapan,Mass. T6	4.65	6.25	6.85	8.80	11.10
NewBritn.,Conn.(10) S15	4.15	5.95	6.55	8.50	10.80
NewCastle,Pa. B4	4.15	5.95	6.55	8.50	....
NewCastle,Pa. E5	4.15	5.95	6.55	8.50	10.80
NewYork W3	...	6.30	6.90	8.85	11.15
Pawtucket,R. I. N8: Cleve.orPitts.Base .(29)	4.55	5.50	6.10	8.05	10.35
Worcester,Base ....(29)	4.50	5.80	6.40	8.35	10.65
Sharon,Pa. S3	4.15	5.95	6.55	8.50	10.80
Trenton,N.J. R5	...	6.25	6.85	8.80	11.10
Wallingford,Conn. W2..	4.65	6.25	6.85	8.80	11.10
Weirton,W.Va. W6	4.15	5.95	6.55	8.50	10.80
Worcester,Mass. A7 ...	4.45	6.25	6.85	8.80	11.10
Worcester,Mass. T6	4.65	6.25	6.85	8.80	11.10
Youngstown C8	4.50	5.95	6.55	8.50	10.80
Spring Steel (Tempered)					
Trenton,N.J. R5	...	...	9.30	11.25	13.85
Harrison,N.J. C18	...	...	9.30	11.25	13.85

Key to Producing Companies

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel&Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth.Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bolardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B14 A. M. Byers Co.

C1 Calif. Cold Rolled Steel
C3 Carnegie-Illinois Steel
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Clev. Cld.Roll.Mills Co.
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Son, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F6 Fretz-Moon Tube Co.

G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H4 Heppenstall Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K5 Kidd Drawn Steel Co.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

TIGHT COOPERAGE HOOP

Atlanta A11 .....3.60
Riverdale,Ill. A1 .....3.60
Sharon,Pa. S3 .....3.60
Youngstown C3 .....3.60

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....5.90
Alton,Ill.(1) L1 .....5.90
Bartonville,Ill.(1) K4 ..5.90
Buffalo W12 .....5.90
Cleveland A7 .....5.90
Donora,Pa. A7 .....5.90
Duluth A7 .....5.90
Fostoria,O. S1 .....5.90
Johnstown,Pa. B2 ....5.90
LosAngeles B3 .....6.85
Milbury,Mass(12) N6 ..6.20
Monessen,Pa. P7, P16 ..5.90
Palmer,Mass. W12 ....6.20
Pittsburg,Calif. C11 ...6.85
Portsmouth,O. P12 ....5.90
Roebling,N.J. R5 .....6.20
So.Chicago,Ill. R2 ....5.90
SparrowsPoint,Md. B2 .6.00
Struthers,O. Y1 .....5.90
Trenton,N.J., A7 .....6.20
Waukegan,Ill. A7 .....5.90
Worcester A7,J4,T6,W12.6.20

WIRE, Cold-Rolled Flat

Anderson,Ind. G6 .....5.35
Buffalo W12 .....5.35
Cleveland A7 .....5.35
Crawfordsville,Ind. M8..5.35
Dover,O. G6 .....5.35
Fostoria,O. S1 .....5.50
Kokomo,Ind. C16 ....5.35
FranklinPark,Ill. T6 ..5.70
Massillon,O. R8 .....5.35
Monessen,Pa. P7, P16 ..5.35
Pawtucket,R.I.(11) N8 .5.70
Pawtucket,R.I.(12) N8 .5.65
Trenton,N.J. R5 .....5.65
Worcester A7, T6, W12.5.65

WIRE, Fine and Weaving (8-in. Coils)

Bartonville,Ill.(1) K4 ..8.45
Buffalo W12 .....8.45
Chicago W13 .....8.45
Cleveland A7 .....8.45
Crawfordsville,Ind. M8..8.45
Fostoria,O. S1 .....8.45
Johnstown,Pa. B2 .....8.45
Kokomo,Ind. C16 .....8.45
Monessen,Pa. P16 ....8.45
Palmer,Mass. W12 ....8.75
Portsmouth,O. P12 ....8.45
Roebling,N.J. R5 .....8.75
Waukegan,Ill. A7 .....8.45
Worcester,Mass. A7, T6.8.75

WIRE, Manufacturers Bright, Low-Carbon

AlabamaCity,Ala. R2 ..4.50
Aliquippa,Pa. J5 .....4.50
Atlanta A11 .....4.60
Alton,Ill.(1) L1 .....4.50
Bartonville,Ill.(1) K4 ..4.50
Buffalo W12 .....4.50
Chicago W13 .....4.50
Cleveland A7, C20 ....4.50
Crawfordsville,Ind. M8..4.60
Donora,Pa. A7 .....4.50
Duluth A7 .....4.50
Fairfield,Ala. T2 .....4.50
Fostoria,O.(24) S1 ....4.85
Houston S5 .....4.90
Johnstown,Pa. B2 .....4.50
Joliet,Ill. A7 .....4.50
KansasCity,Mo. S5 ....5.10
Kokomo,Ind. C16 .....4.60
LosAngeles B3 .....5.45
Minnequa,Colo. C10 ....4.75
Monessen,Pa. P7 .....4.50
Newark,6-8ga. I-1 ....5.15
No.Tonawanda B11 ...4.90
Palmer,Mass. W12 ....4.80
Pittsburg,Calif. C11 ...5.45
Portsmouth,O. P12 ....4.50
Rankin,Pa. A7 .....4.50
So.Chicago,Ill. R2 ....4.50
So.SanFrancisco C10 ...5.45
SparrowsPoint,Md. B2 ..4.60
Sterling,Ill.(1) N15 ....4.50
Struthers,O. Y1 .....4.50
Torrance,Calif. C11 ....5.45
Waukegan,Ill. A7 .....4.50
Worcester,Mass. A7, T6.4.80

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....5.55
Alton,Ill.(1) L1 .....5.55
Buffalo W12 .....5.55
Cleveland A7 .....5.55
Donora,Pa. A7 .....5.55
Duluth A7 .....5.55
Johnstown,Pa. B2 .....5.55
LosAngeles B3 .....6.50
Monessen,Pa. P7, P16 ..5.55
NewHaven,Conn. A7 ...5.85
Palmer,Mass. W12 ....5.85
Pittsburg,Calif. C11 ...6.50
Portsmouth,O. P12 ....5.55
Roebling,N.J. R5 .....5.85
So.Chicago,Ill. R2 ....5.55
SparrowsPoint,Md. B2 ..5.65
Struthers,O. Y1 .....5.55
Torrance,Calif. C11 ....6.50
Trenton,N.J. A7 .....5.85
Waukegan,Ill. A7 .....5.55
Worcester,Mass. A7 ....5.85

ROPE WIRE	Mild Plow	Plow	Imp. Plow
Bartonville,Ill. K4	8.05	8.05	8.30
Buffalo W12	8.05	8.05	8.30
Cleveland A7	8.05	8.05	8.30
Donora,Pa. A7	8.05	8.05	8.30
Fostoria,O. S1	8.05	8.05	8.30
Johnstown,Pa. B2	8.05	8.05	8.30
Monessen,Pa. P7, P16	8.05	8.05	8.30
NewHaven,Conn. A7	8.35	8.35	8.60
Palmer,Mass. W12	8.05	8.05	8.30
Portsmouth,O. P12	8.05	8.05	8.30
Roebling,N.J. R5	8.35	8.35	8.60
SparrowsPoint,Md. B2	8.15	8.15	8.40
Struthers,O. Y1	8.05	8.05	8.30
Trenton,N.J. A7	8.35	8.35	8.60
Waukegan,Ill. A7	8.05	8.05	8.30
Williamsport,Pa. B2	8.15	8.15	8.40
Worcester,Mass. J4, T6	8.35	8.35	8.60

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
AlabamaCity R2	5.35	5.60
Aliquippa J5	5.35	5.60
Atlanta A11	5.45	5.70
Bartonville(19) K4	5.35	5.60
Buffalo(31) W12	4.50	...
Cleveland A7	5.35	5.60
Crawfordsvil. M8	5.45	5.70
Donora A7	5.35	5.60
Duluth A7	5.35	5.60
Fairfield T2	5.35	5.60
Houston,Tex. S5	5.75	6.00
Johnstown B2	5.35	5.60
Joliet,Ill. A7	5.35	5.60
KansasCy,Mo. S5	5.95	6.20
Kokomo C16	5.45	5.70
LosAngeles B3	6.30	...
Minnequa C10	5.60	5.85
Monessen P7	5.35	5.60
Palmer(31) W12	4.80	...
Pitts.,Cal. C11	6.30	6.55
Prtsmth.(18) P12	5.35	5.60
Rankin A7	5.35	5.60
So.Chicago R2	5.35	5.60
So.S.Fran. C10	6.30	6.55
SparrowsPt. B2	5.45	5.70
Sterling,Ill.(1)N15	5.35	5.60
Struthers,O. Y1	5.35	5.60
Torrance,Cal. C11	6.30	...
Worcester A7	5.65	5.90

WIRE (16 gage)	An'ld. Stone	Galv. Stone
Aliquippa J5	9.80	11.30
Bartonville(1) K4	9.80	11.30
Cleveland A7	9.80	11.30
Crawfrdsvil. M8	9.80	11.30
Fostoria,O. S1	9.90	11.40
Johnstown B2	9.80	11.30
Kokomo C16	9.80	11.30
Minnequa C10	9.40	10.90
Palmer,Mass. W12	9.35	10.85
Pitts.,Cal. C11	10.15	11.65
Prtsmth.(18) P12	9.80	11.30
SparrowsPt. B2	9.90	11.40
Waukegan A7	9.80	11.30

WIRE, Galv'd ACSR for Cores

Monessen,Pa. P16 ....8.15
Roebling,N.J. R5 .....8.45
SparrowsPoint,Md. B2 ..8.25

WIRE, Tire Bead

Monessen,Pa. P16 ....10.80
Roebling,N.J. R5 ....10.80

WIRE, Barbed — Col.

AlabamaCity,Ala. R2 ...126
Aliquippa,Pa. J5 126
Atlanta A11 128
Crawfordsville M8 128
Donora,Pa. A7 126
Duluth,Minn. A7 126
Fairfield,Ala. T2 126
Houston,Tex. S5 134
Johnstown,Pa. B2 126
Joliet,Ill. A7 126
KansasCity,Mo. S5 138
Kokomo,Ind. C16 128
Minnequa,Colo. C10 131
Monessen,Pa. P7 126
Pittsburg,Calif. C11 146
Portsmouth,O.(18) P12..126
Rankin,Pa. A7 126
So.Chicago,Ill. R2 126
So.SanFran.,Calif. C10..146
SparrowsPoint,Md. B2 ..128
Sterling,Ill.(1) N15 126

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Huntington,W.Va. W7 ..116
Johnstown,Pa. B2 116
Joliet,Ill. A7 116
Minnequa,Colo. C10 121
Moline,Ill. R2 112
So.Chicago R2 116
Williamsport,Pa. S19 ...120

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Aliquippa,,Pa.9-14½ga.J5 116
Atlanta A11 118
Bartonville,Ill.(19) K4 ..116
Crawfordsville,Ind. M8 ..118
Donora,Pa. A7 116
Duluth A7 116
Houston,Tex. S5 124
Fairfield,Ala. T2 116
Johnstown,Pa. B2 116
Johnstn,17ga.6" B2 190
Johnstn,17ga.,4" B2 193
Joliet,Ill. A7 116
KansasCity,Mo. S5 128
Kokomo,Ind. C16 118
Minnequa,Colo. C10 121
Monessen,Pa. P7 116
Pittsburg,Calif. C11 139
Portsmouth,O.(18) P12..116
Rankin,Pa. A7 116
So.Chicago,Ill. R2 116

BALE TIES, Single Loop — Col.

AlabamaCity,Ala. R2 ..113
Atlanta A11 114
Bartonville,Ill.(19) K4 ..113
Chicago W13 113
Crawfordsville M8 115
Donora,Pa. A7 113
Duluth A7 113
Fairfield,Ala. T2 113
Joliet,Ill. A7 113
KansasCity,Mo. S5 125
Kokomo,Ind. C16 115
Minnequa,Colo. C10 118
Pittsburg,Calif. C11 137
Portsmouth,O.(18) P12..113
So.Chicago,Ill. R2 113
So.SanFran.,Calif. C10 ..137
SparrowsPoint,Md. B2 ..115
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Aliquippa,Pa. J5 106
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Bartonville,Ill.(19) K4 ..106
Chicago,Ill. W13 106
Cleveland A9 112
Crawfordsville,Ind. M8 ..108
Donora,Pa. A7 106
Duluth A7 106
Fairfield,Ala. T2 106
Galveston,Tex. D7 114
Houston,Tex. S5 114
Johnstown,Pa. B2 106
Joliet,Ill. A7 106
KansasCity,Mo. S5 118
Kokomo,Ind. C16 108
Minnequa,Colo. C10 111
Monessen,Pa. P7 106
Pittsburg,Calif. C11 125
Portsmouth,O. P12 106
Rankin,Pa. A7 106
So.Chicago,Ill. R2 106
SparrowsPoint,Md. B2 ..108

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	TeeRails 60 lb Under
Bessemer,Pa. C3	3.40	3.30	3.35	3.75
Ensley,Ala. T2	3.40	3.30	...	3.75
Fairfield,Ala. T2	...	...	...	3.75
Gary,Ind. C3	3.40	3.30	3.35	...
Huntington,W.Va. W7	...	...	...	3.75
Ind.Harbor,Ind. I-2	3.40	3.30	3.35	...
Johnstown,Pa. B2	...	...	...(16)	3.75
Lackawanna B2	3.40	3.30	...	3.75
Minnequa,Colo. C10	3.40	3.30	...	4.25
Steelton,Pa. B2	3.40	3.30	...	...

NAILS, Cut (100 lb keg) To dealers (33)

Conshohocken,Pa. A3..$6.75
Wheeling,W.Va. W10 ..6.75

AXLES

Fairfield,Ala. T2 .....5.25
Gary,Ind. C3 .....5.25
Ind.Harbor,Ind. S13 ...5.25
Johnstown,Pa. B2 .....5.25
McKeesRocks,Pa. C3 ...5.25

TIE PLATES

Fairfield,Ala. T2 .....4.20
Gary,Ind. C3 .....4.20
Ind.Harbor,Ind. I-2 ...4.20
Lackawanna,N.Y. B2 ...4.20
Minnequa,Colo. C10 ...4.20
Pittsburg,Calif. C11 ...4.35
Pittsburgh R2 .....4.20
Seattle B3 .....4.35
Steelton,Pa. B2 .....4.20
Torrance,Calif. C11 ....4.35
Weirton,W.Va. W6 ....4.20

JOINT BARS

Bessemer,Pa. C3 .....4.40
Fairfield,Ala. T2 .....4.40
Ind.Harbor,Ind. I-2 ...4.40
Joliet,Ill. C3 .....4.40
Lackawanna,N.Y. B2 ..4.40
Minnequa,Colo. C10 ....4.40
Steelton,Pa. B2 .....4.40

TRACK BOLTS (20) Treated

Fairfield,Ala. T2 .....9.10
KansasCity,Mo. S5 ....9.10
Lebanon,Pa.(32) B2 ..8.85
Minnequa,Colo. C10 ....8.85
Pittsburgh O3, P14 ....9.10
Seattle B3 .....9.35

STANDARD TRACK SPIKES

Fairfield,Ala. T2 .....5.60
Ind.Harbor,Ind. I-2, Y1.5.60
KansasCity,Mo. S5 ....5.85
Lebanon,Pa. B2 .....5.60
Minnequa,Colo. C10 ....5.60
Pittsburgh J5 .....5.60
Seattle B3 .....6.10
So.Chicago,Ill. R2 ....5.60
Struthers,O. Y1 .....5.60
Youngstown R2 .....5.60

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2 ..5.35
Bartonville,Ill.(19) K4 ..5.35
Crawfordsville,Ind. M8..5.45
Donora,Pa. A7 .....5.35
Duluth A7 .....5.35
Johnstown,Pa. B2 .....5.35
Joliet,Ill. A7 .....5.35
Kokomo,Ind. C16 .....5.45
Minnequa,Colo. C10 ....5.60
Pittsburg,Calif. C11 ....6.30
Portsmouth,O. P12 ....5.35
Rankin,Pa. A7 .....5.35
So.Chicago,Ill. R2 .....5.35
SparrowsPoint,Md. B2 ..5.45
Worcester,Mass. A7 ....5.65

NAILS, Cut (100 lb keg) To dealers (33)

Conshohocken,Pa. A3..$6.75
Wheeling,W.Va. W10 ..6.75

AXLES

Fairfield,Ala. T2 .....5.25
Gary,Ind. C3 .....5.25
Ind.Harbor,Ind. S13 ...5.25
Johnstown,Pa. B2 .....5.25
McKeesRocks,Pa. C3 ...5.25

TIE PLATES

Fairfield,Ala. T2 .....4.20
Gary,Ind. C3 .....4.20
Ind.Harbor,Ind. I-2 ...4.20
Lackawanna,N.Y. B2 ...4.20
Minnequa,Colo. C10 ...4.20
Pittsburg,Calif. C11 ...4.35
Pittsburgh R2 .....4.20
Seattle B3 .....4.35
Steelton,Pa. B2 .....4.20
Torrance,Calif. C11 ....4.35
Weirton,W.Va. W6 ....4.20

JOINT BARS

Bessemer,Pa. C3 .....4.40
Fairfield,Ala. T2 .....4.40
Ind.Harbor,Ind. I-2 ...4.40
Joliet,Ill. C3 .....4.40
Lackawanna,N.Y. B2 ..4.40
Minnequa,Colo. C10 ....4.40
Steelton,Pa. B2 .....4.40

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Lebanon,Pa. B2 .....5.60
Minnequa,Colo. C10 ....5.60
Pittsburgh J5 .....5.60
Seattle B3 .....6.10
So.Chicago,Ill. R2 ....5.60
Struthers,O. Y1 .....5.60
Youngstown R2 .....5.60

Key to Producing Companies

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M10 Missouri-Illinois Furnace
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.
N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 New EngHighCarb. Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg.Co.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills.
P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
U1 Ulster Iron Works
U4 Universal Cyclops Steel
V2 Vanadium Alloys Steel
V3 Vulcan Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Wstrn.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W16 Worth Steel Co.
W18 Wyckoff Steel Co.
Y1 Youngstwn Sheet & Tube

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	21.00	18W,4Cr,3V	126.00
Extra Carbon	24.50	18W,4Cr,2V,9Co	185.50
Spec. Carbon	29.50	18W,4Cr,2V,6Co	169.50
Oil Hardening	32.00	18.25W,4.25Cr,1V,4.75Co	156.50
Cr Hot Wrk.	32.00	20.25W,4.25Cr,1.6V,12.25Co	293.50
Hi-Carbon-Cr	57.50	1.5W,4Cr,1V,8.5Mo	71.50
18W,4Cr,1V	100.00	6.4W,4.5Cr,1.9V,5Mo.	76.50
18W,4Cr,2V	113.00	6W,4Cr,3V,6Mo	97.00

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M9, M14, R2, S8, T7, U4, V2, V3.

(1) Chicago Base. (2) Angles.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. Base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh Base.
(11) Cleveland & Pittsburgh Base.
(12) Worcester, Mass. Base.
(13) 3"& wider; over ½" to under 3" 5.15c.
(14) Also wide flange beams.
(15) ½" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh Base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. Base.
(22) Del. San Fran. Bay area.
(23) Angles 1"x1" to 1¼"x1¼" only.
(24) Deduct 0.35c for finer than 15 Ga.
(25) Up to 0.035 C; 4.40c, 0.035 C and over.
(26) Reinforcing, mill shipments; to consumers, 4.83c; fabricated to fabricators, 4.58c.
(28) Bonderized.
(29) 0.26-0.40 C.
(30) 0.40 C and less.
(31) Not annealed.
(32) Untreated.
(33) To jobbers, deduct 20 cents.
(34) 6.70c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 Ga. & lighter; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 4.40c, 0.035" and heavier.
(41) Flats.
(42) Bands.

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	36.5	34.5	35.5	8.5	9	7.5
¼	6.0	0.42	33.5	31.5	32.5	9.5	11	8.5
⅜	6.0	0.57	29	27.	28	5.5	8	4.5
½	8.5	0.85	40.5	38.5	39.5	24.0	22.0	23.0
¾	11.5	1.13	43.5	41.5	42.5	28.0	26.0	27.0
1	17.00	1.68	46.0	44.0	45.0	31.0	29.0	30.0
1¼	23.0	2.28	46.5	44.5	45.5	31.5	29.5	30.5
1½	27.5	2.73	47.0	45.0	46.0	32.0	30	31.0
2	37.0	3.68	47.5	45.5	46.5	32.5	30.5	31.5
2½	58.5	5.82	48.0	46.0	47.0	33.0	31.0	32.0
3	76.5	7.62	48.0	46.0	47.0	33.0	31.0	32.0

Column A: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 1½ percentage points lower on ⅛", 2 points lower on ¼", 3 points lower on ⅜", W10. Wheatland, Pa., 2 pts lower on ⅛" through ⅜", W9. Following make ½" and larger: Lorain, O. N3; Youngstown, plus 42% on 3½" and 4", R2; Youngstown Y1; Aliquippa, Pa. J5. Fontana,Calif. K1 quotes 11 points lower on ½" and larger continuous weld and 31% on 3½" and 4".

Columns B & E: Sparrows Point Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y-1; Alton, Ill. (Lorain, O., base) L1 quotes 2 points lower on ⅛", ¼", ⅜".

Column D: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa., ⅛" through ⅜", F6; Benwood, W. Va., except 3½ points lower on ⅛", 2½ pts on ¼", 3 pts on ⅜", W10. Wheatland, Pa., except 2 pts lower on ⅛" through ⅜", W9. Following make ½" and larger: Lorain N3; Youngstown, plus 26.5% on 3½" and 4", R2; Youngstown, Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11 points lower on ½" and larger continuous weld and 15.5% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	36.0	20.5	36.0	20.5
2½	58.5	5.82	39.0	23.5	39.0	23.5
3	76.5	7.62	39.0	23.5	39.0	23.5
3½	92.0	9.20	41.0	25.5	41.0	25.5
4	$1.09	10.89	41.0	25.5	41.0	25.5
5	1.48	14.81	41.0	25.5	41.0	25.5
6	1.92	19.18	41.0	25.5	41.0	25.5

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5; Lorain, O. N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	12.36	14.39	13.96	13.96
1¼	13	14.63	17.05	14.19	16.54
1½	13	16.17	19.02	15.68	18.45
1¾	13	18.39	21.64	17.84	20.99
2	13	20.61	24.24	19.99	23.51
2¼	13	22.96	27.03	22.27	26.22
2¼	12	25.29	29.76	24.53	28.87
2½	12	27.71	32.58	26.88	31.60
2¾	12	29.36	34.53	28.48	33.49
3	12	30.82	36.27	29.90	35.18
3¼	11	35.87	42.22	34.79	40.95
3½	11	38.52	45.35	37.36	43.99
4	10	47.82	56.25	46.39	54.56
4½	9	63.37	74.59	61.47	72.35
5	9	73.37	86.32	71.17	83.73
6	7	112.62	132.51	....	....

Boiler tube producers include Babcock & Wilcox Tube Co., National Tube Co., Globe Steel Tubes Co., Pittsburgh Steel Co., Republic Steel Corp., Standard Tube Co.

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates Carbon Base 10%	Plates Carbon Base 20%	Strip Cold-Rolled Carbon Base 10% Both sides	Sheets Carbon Base 10%	Sheets Carbon Base 20%	Sheets Copper Base Both Sides
302	....	....	....	19.75	21.50–22.50	75.00
304	22.50	26.50	....	20.75	22.50–24.00	77.00
305	....	....	....	....	....	79.00
309	27.00	31.00	....	....	....	....
310	32.50	36.50	....	....	....	105.00
316	27.00	31.00	....	26.00	28.00–32.00	....
317	30.50	34.50	....	....	....	....
318	29.50	33.50	....	....	....	....
321	23.50	27.50	....	23.00	25.00	90.00
347	25.00	29.00	....	24.00	26.00–30.00	94.00
405	18.75	24.75	....	....	....	....
410	18.25	24.25	....	....	....	....
430	18.25	24.25	....	....	....	....
Nickel	27.50	34.50	31.50	41.00	....	88.00
Inconel	36.00	46.00	....	....	....	115.00
Monel	29.00	37.00	26.50	33.50	....	83.00
Copper*	....	....	19.75†	23.75†	....	....

* Dexodized. † Deduct 4.25c for hot-rolled. Production points for carbon base products; Stainless plates and sheets, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. W16 and Coatesville, Pa. L7; nickel, inconel and monel-clad plates, Coatesville L7; nickel, monel and copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:
- ½-in. & smaller diam. 27
- ⅝-in. & ⅝-in. 29
- ¾-in. and larger 26

Longer than 6 in.:
- All diams. 22

Lag bolts, all diams.:
- 6 in. and shorter 30
- over 6 in. long 28

Ribbed Necked Carriage. 26
Blank 40
Plow 40
Step, Elevator, Tap, and Sleigh Shoe 28
Tire bolts 20
Boiler & Fitting-Up Bolts 37

NUTS

H.P. & C.P. Reg. & Heavy Square:

½-in. and smaller	25
⅝-in. & ⅝-in.	23
¾-in.-1½-in.	23
1⅝ in. and larger	16

H.P. Hex.:	Reg.	Heavy
½-in. & smaller	33	29
⅝-in. & ⅝-in..	28	25
¾-in.-1½-in. ..	25	23
1⅝ in. & larger	17	16

C.P. Hex:		
½-in. & smaller	33	29
⅝-in. & ⅝-in..	30	27
¾-in. & 1½ in.	27	24
1⅝ in. & larger	20	17

SEMIFINISHED NUTS

American Standard
(Per cent off list for less than case or key quantities)

	Hvy.	Reg.	Lght.
½-in. and smaller	35	41	41
⅝-in. & ⅝-in.	30	36	36
¾-in.-1½ in..	27	31	33
1⅝-in.&larger	17	21	..

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish ..... 63.5 & 10
Plated finishes ... 50 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:
- ¼-in. through ⅝-in... 50
- ¾-in. through 1 in... 43

Longer than 6 in.:
- ¼-in. through ⅝-in... 33
- ¾-in. through 1 in... 13

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam x 6 in. and shorter 46
1 in. and smaller diam. x over 6 in. 33

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller 41
¼-in. diam. & larger ... 24
N.F. thread, all diams. . 18

RIVETS

F.o.b. midwestern plants
Structural ½-in., larger 7.25c
7/16-in., under .....43 off

Washers, Wrought

F.o.b. shipping point, to jobbers .....Net to $1 off

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Inches Length	Cents per lb
17,18,20	60,72	16.00
8 to 16	48,60,72	16.50
7	48,60	17.75
6	48,60	19.00
4, 5⅛	40	19.50
3	40	20.50
2½	24,30	21.00
2	24,30	23.00

CARBON

40	100,110	7.50
35	100,110	7.50
30	84,110	7.50
24	72 to 104	7.50
17 to 20	34,90	7.50
14	60,72	8.00
10,12	60	8.25

STAINLESS STEEL

(cents per pound)

Type	Sheets	C.R. Strip	Bars Wire Structurals
301...	37.50	30.50	28.50
302...	37.50	33.00	28.50
...	39.50	36.50	31.00
304...	39.50	35.00	30.00
309...	52.00	52.00	41.50
316...	53.00	55.00	46.00
321...	45.50	44.50	34.00
347...	50.00	48.50	38.50
410...	33.00	27.00	23.00
416...	33.50	33.50	23.50
420...	40.50	43.50	28.50
430...	35.50	27.50	23.50
501...	24.00	22.50	11.50
502...	25.00	23.50	12.50

Baltimore, Types 301 through 347 sheets, except 309 E2.
Baltimore, bars, wire and structurals A10.
Brackenridge,Pa., sheets A4
Bridgeville, Pa., bars, wire, sheets & strip, except Type 309 strip quoted 51.00c U4.
Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502 A10.
Carnegie, Pa., strip except Type 416; Type 309 strip quoted 51.00c S18.
Cleveland, strip, except Type 309 quoted 51.00c and except Type 416 A7.
Detroit, strip, except Type 309 M1.
Dunkirk,N.Y. bars, wire A4.
Duquesne, Pa., bars C3.
Gary, Ind., sheets except Type 416 C3.
Harrison, N. J., strip C18.
Massillon, all products, except Type 309 bars, wire & structurals quoted 42.00c, Type 501, 10.50c, Type 502 11.50c R2.
McKeesport, Pa., bars; sheets except Type 416, C3.
McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.
Middletown, O., sheets and strip, except Types 303, 416, 420, 501 and 502 A10.
Midland, sheets & strip C18.
Munhall, Pa., bars C3.
Pittsburgh, sheets C18.
Reading, Pa., bars & strip except Type 309 bars quoted 41.00c C4.
So. Chicago, Ind., bars & structurals C3.
Syracuse, N. Y., bars wire & structurals C18.
Titusville, Pa., bars U4.
Wallingford, Conn., strip, except 309, W2 quotes ¼-cent higher.
Washington, Pa., bars sheets & strip except Type 309 strip quoted 51.00c J3.
Washington, Pa., Types 301 through 347 sheets & strip as listed except 303 & 309; 316 sheets 58.00c, strip 60.00c W4.
Watervliet, N. Y., structurals & bars A4.
Waukegan, bars & wire A7
West Leechburg, Pa., strip, except Type 300 quoted 51.00c A4.
Youngstown, strip C8.

COAL, CHEMICALS

Spot, cents per gallon, ovens
Pure benzol 22.00
Toluol, one deg..19.00-24.75
Industrial xylol..20.50-26.50

Per ton bulk, ovens

Sulphate of ammonia..$45.00

Cents per pound, ovens

Phenol, 40 (carlots, returnable drums) 13.50
Do., less than carlots.14.25
Do., tank cars 12.50

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34.
Imported, net ton, duty paid, metallurgical grade, $39-$40.

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh)

	Cents
Sponge Iron:	
98+% Fe, carlots..	15.00
Swedish, c.i.f. New York, in bags..	7.40-8.50
Electrolytic Iron:	
Annealed, 99.5% Fe	39.50
Unannealed, 99+% Fe	33.50
Unannealed, 99+% Fe (minus 325 mesh)	48.50
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns..	70.00-135.00
Aluminum:	
Carlots, freight allowed	27.00
Atomized, 500 lb drums, freight allowed	30.00
Brass, 10-ton lots	23.25-26.25
Copper:	
Electrolytic	27.75
Reduced	27.00
Lead	18.50
Manganese:	
Minus 100-mesh	52.00-55.00
Minus 35 mesh	48.00
Minus 200 mesh	56.00
Nickel, unannealed	61.00-66.00
Silicon	34.00-40.00
Solder (plus cost of metal)	8.50
Stainless Steel, 302...	75.00
Tin	86.50
Zinc, 10-ton lots..	15.25-18.00
	Dollars
Tungsten:	
99%, minus 80 to 200 mesh, freight allowed, over 1000 lb	2.90
1000 lb	2.95
less than 1000 lb..	3.00
98.8%, minus 65 mesh, freight allowed. 1000 lb and over..	2.90
less than 1000 lb..	3.00
Molybdenum:	
99%, minus 80 to 200 mesh, over 500 lb	2.25
200 to 500 lb	2.60
less than 200 lb...	2.75
82-88%, freight allowed. 2000 lb and over..	2.40
less than 2000 lb..	2.45
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvil,fur.	$14.00-14.50
Connellsvil,fdry.	15.50-16.50
New River, foundry	19.00
Wise county, foundry	15.95
Wise county, furnace..	15.20

OVEN FOUNDRY COKE

Kearney, N. J., ovens	$22.00
Everett, Mass., ovens New England, del.‡	23.40
Chicago, ovens	21.00
Chicago, del.	†22.45
Detroit, del.	24.91
Terre Haute, ovens	21.20
Milwaukee, ovens	21.75
Indianapolis, ovens	20.75
Chicago, del.	24.12
Cincinnati, del.	23.67
Detroit, del.	24.65
Ironton, O., ovens	20.40
Cincinnati, del.	22.71
Painsville, O., ovens	21.90
Buffalo, del.	24.02
Cleveland, del.	23.62
Erie, del.	22.04
Birmingham, ovens	*19.15*
Philadelphia, ovens	21.25
Neville Island,Pa.,ovens	21.00
Swedeland, Pa., ovens	21.20
Portsmouth, O., ovens.	19.50
Detroit, ovens	21.65
Detroit, del.	22.65
Buffalo, del.	24.00
Flint, del.	24.09
Pontiac, del.	23.04
Saginaw, del.	24.40

Includes representative switching charge of: *, $1.05; †, $1.45, one-track charge being $1.20, two tracks $1.40, and three or more tracks $1.50. ‡ Or within $4.15 freight zone from works.

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	5.75	6.84	7.20	6.04	...	5.85	6.64	8.60	5.65	5.90	7.34
New York(c'try)	5.55	6.64	7.00	5.84	...	5.65	6.44	8.40	5.45	5.70	7.14
Boston (city) ..	5.93	6.68	7.19	5.98	...	5.80	6.50	8.70	5.75	6.08	7.28
Boston (c'try) .	5.73	6.48	6.99	5.78	...	5.60	6.30	8.50	5.55	5.88	7.08
Phila. (city) ..	6.45	6.60	6.95	5.90	...	5.75	6.46	8.40	5.50	5.70	6.80
Phila. (c'try)..	6.20	6.35	6.70	5.65	...	5.50	6.21	8.15	5.25	5.45	6.55
Balt. (city) ...	5.25	6.69	6.66	5.79	...	5.69	6.39	...	5.69	5.40	7.04
Balt. (c'try) ..	5.05	6.49	6.46	5.59	...	5.49	6.19	...	5.49	5.20	6.84
Norfolk, Va. ..	6.10	...	...	...	...	6.15	7.20	...	6.20	6.15	7.55
Wash. (w'hse).	5.46	...	...	6.00	...	5.90	6.62	...	5.90	5.61	7.25
Buffalo (del.)..	5.25	6.00	7.00	5.61	...	5.25	5.95	10.10††[5]	5.35	5.65	6.95
Buffalo (w'hse)	5.05	5.80	6.80	5.41	...	5.05	5.75	9.90††[5]	5.15	5.45	6.75
Pitts. (w'hse)..	5.05	5.80*	6.45-6.70	5.20	6.15	5.00	5.75	9.55††	5.05	5.15	6.40
Detroit (w'hse).	5.33	6.08*	7.09	5.49	...	5.39	6.03	9.86††[5]	5.44	5.59	6.68
Cleveland (del.)	5.25	6.00	7.15	5.44	6.35	5.32	5.95	8.31	5.37	5.52	6.72
Cleve. (w'hse).	5.05	5.80	6.95	5.24	6.15	5.12	5.75	8.16	5.17	5.32	6.52
Cincin. (w'hse).	5.32	5.84	6.29	5.49	...	5.39	6.10	9.90††[5]	5.44	5.59	6.75
Chicago (city) .	5.25	6.00*	6.90	5.30	...	5.20	5.85	9.75††[5]	5.25	5.40	6.60
Chicago (w'hse)	5.05	5.80*	6.70	5.10	...	5.00	5.65	9.55††[5]	5.05	5.20	6.40
Milwaukee(city)	5.39	6.14*	7.04	5.44	...	5.34	6.09	9.89††[5]	5.39	5.54	6.74
Milwau. (c'try).	5.19	5.94*	6.84	5.24	...	5.14	5.89	9.69††[5]	5.19	5.34	6.54
St. Louis (del.).	5.78	6.28	7.18	5.58	...	5.48	6.28	10.03††[5]	5.53	5.68	6.88
St. L. (w'hse).	5.58	6.13	7.03	5.43	...	5.33	6.08	9.88††[5]	5.38	5.53	6.73
Birm'ham (del.)	5.20[10]	5.95	6.30[2]	5.25[10]	...	5.15[10]	6.88	...	5.20[10]	5.35[10]	7.63[10]
Birm'hm(w'hse)	5.05[10]	5.80	6.15[2]	5.10[10]	...	5.00[10]	...	...	5.05[10]	5.20[10]	...
Omaha, Nebr. .	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Los Ang. (city)	6.00	7.20	7.65	6.05	8.30	6.00	7.75	...	5.90	6.00	8.20
L. A. (w'hse).	5.80	7.00	7.45	5.85	8.10	5.80	7.55	...	5.70	5.80	8.00
San Francisco .	6.25[9]	8.60[3]	7.50[3]	6.75[9]	8.25[3]	6.15[9]	7.80[3]	...	6.00[9]	6.15[9]	8.10[9]
Seattle-Tacoma.	6.70[7]‡	8.15[3]	...	6.90	...	6.35	8.50	10.10	6.20	6.35[7]	8.40[7]
Kans. (w'hse) .	5.65	6.40	7.30	5.70	...	5.60	6.35	10.10	5.65	5.80	7.00

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [1]—1500 lb and over; [2]—500 to 1499 lb; [3]—450 to 1499 lb; [4]—400 to 1499 lb; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—300 to 999 lb; [8]—300 to 499 lb; [9]—400 to 3999 lb; [10]—500 to 9999 lb inclusive.

REFRACTORIES

(Prices per 1000 bricks, f.o.b. plant)

FIRE CLAY BRICK

***Super Duty*:** St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., $107; Ottawa, Ill., $106. Hard-fired, $141 at above points.

***High-Heat Duty*:** Salina, Pa. $91; Woodbridge N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $86.

***Intermediate-Heat Duty*:** St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $80.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., $72; Ottawa, Ill., $70.

LADLE BRICK

***Dry Press*:** Freeport, Merill Station, Clearfield, Pa., Irondale, Wellsville, O., Chester, W. Va., New Cumberland, W. Va., $60.

***Wire Cut*:** Chester, W. Va., Wellsville, O., New Cumberland, W. Va., $58.

MALLEABLE BUNG BRICK

St. Louis, Mo., Olive Hill, Ky., $96; Ottawa, Ill., $90; Beach Creek, Pa., $86.

SILICA BRICK

Mt. Union, Claysburg, or Sproul, Pa., Portsmouth, O., Ensley, Ala., $86; Hays, Pa., $91; Joliet or Rockdale, Ill., E. Chicago, Ind., $95; Lehi, Utah, Los Angeles, $101.

Eastern Silica Coke Oven Shapes (net ton): Claysburg, Mt. Union, Sproul, Pa., Birmingham, $84.

Illinois Silica Coke Oven Shapes (net ton): Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $85.

BASIC BRICK

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Burned chrome brick, $66; chemical-bonded chrome brick, $69; magnesite brick, $91; chemical-bonded magnesite, $80.

MAGNESITE

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ⅜" grains; bulk, $30.50-$31; single paper bags, $35-$35.50.

DOLOMITE

(Base prices per net ton)

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Nario, Millersville, Martin, Gibsonburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Bonne Terre, Mo., $12.45.

ORES

LAKE SUPERIOR IRON ORE

Gross ton, 51½% (natural), lower lake ports. After Jan. 25, 1950, increases or decreases, if any, in upper lake rail freight, dock handling charges and taxes thereon are for buyer's account.

Old range bessemer	$8.10
Old range nonbessemer	7.95
Mesabi bessemer	7.85
Mesabi nonbessemer	7.70
High phosphorus	7.70

EASTERN LOCAL ORE

Cents per unit, del E. Pa.

Foundry and basic 56.62% concentrates contract	16.00

FOREIGN ORE

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hemitites	15.75
Brazilian iron ore, 68-69%	18.00

TUNGSTEN ORE

Wolframite, scheelite, net ton unit, duty paid	$20-$22

MANGANESE ORE

Long term contracts, nominal; nearby, 48%, duty paid, 79.8c-81.8c per long ton unit, c.i.f. U. S. ports; prices on lower grades adjusted to manganese content and impurities.

CHROME ORE

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00

South African Transvaal

44% no ratio	$17.00-18.00
48% 3:1 ratio	$17.30-18.30
48% no ratio	26.00
50% no ratio	27.00-27.50

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	25.00
48% 3:1 lump	35.00-36.00

Domestic—rail nearest seller

48% 3:1	$39.00

MOLYBDENUM

Sulphide concentrates per lb, molybdenum content, mines	$0.90

FERROALLOYS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, cl., packed, $184; gross ton lots, packed, $199; less gross ton lots, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload lump bulk, 29c per lb of metal; packed, 35.5c; ton lot 31.25c, less ton lot 33.25c. Delivered. Spot, add 2c.

Manganese, Electrolytic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 35,999 lb, 30c; 36,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr. c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered: Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

(*Please turn to page* 150)

Metal Price Tone Strengthens

Consumers of copper, lead and zinc enter the markets more actively. Prime western zinc attains highest price level since June, 1949. Use of aluminum continues to expand

New York—Undertone of nonferrous metal markets continues strong. Heavy buying of zinc bolsters that market, resulting in a further price rise to 10.50c, East St. Louis, highest level since June 7, 1949.

While lead price is unchanged, increased buying activity has strengthened the market.

Forecasts are supplies of copper will remain tight for some time, indicating prices will hold, possibly move into higher ground.

Domestic producers of these metals are restraining optimism since the industry is faced with threat of large importations of metal and concentrates due to low costs of foreign producers. "It is quite conceivable," says Andrew Fletcher, president, St. Joseph Lead Co., "that the supplies of metal in the United States will be in excess of the demand, as was the case in the latter half of 1949 when our government made large purchases from the lead surplus for defense stockpiling."

Prospects for business in first half of 1950 are encouraging. New applications for aluminum are constantly being developed, and present uses are expanding in several important fields.

"The Alcoa management is confident," Arthur V. Davis and Roy A. Hunt said in their report to stockholders of the Aluminum Co. of America, "that acceptance of aluminum will continue to climb for many years to come, as new markets and applications are discovered and fostered."

Distribution of Alcoa aluminum products to industries during 1949 was as follows: Transportation, 18 per cent; building products, 18 per cent; power transmission (conductors), 8 per cent; household appliances, 7 per cent; cooking utensils, 6 per cent; machinery (general and electrical), 4 per cent; shipments to fabricators for further processing, 25 per cent; all other uses, 14 per cent.

STEEL'S Metal Price Averages for March, 1950

(Cents per pound)

Electrolytic Copper, del. Conn.	18.500
Lead, St. Louis	10.763
Prime, Western Zinc, E. St. Louis	9.944
Straits Tin, New York	75.745
Primary Aluminum Ingots, del.	17.000
Antimony, f.o.b. Laredo, Tex.	24.600
Nickel, f.o.b. refinery	40.000
Silver, New York	73.120

Will Sell Italian Quicksilver

New York—Leghorn Trading Co., this city, has been appointed exclusive agent in the United States and Canada for the sale at the "market price" of quicksilver produced by the important Italian quicksilver producers.

This development marks complete breakup of the former Italian-Spanish quicksilver combine, Mercurio-Europeo, which controlled the bulk of the world's ouput. This combine was dissolved on Jan. 1, 1950, reportedly after a difference concerning the disposal last year by Italian producers of about 80,000 flasks of the metal to the United States stockpile. Spanish producers did not participate in this sale. Up to that time, world markets had been shared on the basis of 38 per cent for the Italian producers and 62 per cent for the Spanish.

Subsequently, Metal Traders Inc. was appointed sales agent in the United States for the Spanish producers, but the price at which the metal is offered for sale is above the market here and is based upon $52 a flask quotation at Spanish ports. This is equivalent to about $73 a flask at New York after adding import duty, shipping and other charges. The Italian quicksilver is available at the domestic market price of $70 a flask, New York, including import duty and other charges.

Aluminum Shipments Increase

New York—Shipments of primary aluminum shapes increased 9 million pounds in February from the January level and showed only a slight decrease from the February, 1949, movement.

Shipments of aluminum plate, sheet and strip by members of the Aluminum Association totaled 78,863,987 pounds in February compared with 69,349,364 pounds in January and 79,135,473 pounds in February of last year.

Production of primary aluminum by members of the association was down slightly in February to 100,885,883 pounds from 104,045,600 pounds in January, but was a bit above the February, 1949, output of 99,497,123 pounds.

Zinc Advances to 10.50c

New York—Supplies of zinc available for April and nearby deliveries have dwindled, producers having filled thir order books rather fully. As a result, prices have risen ¼-cent higher by the pressure of consumer demand while at the same time actual sales have been light. An important factor in the recent advance in prices has been the large tonnages withdrawn from the market for stockpiling purposes.

Following the advance in the domestic market, Consolidated Mining & Smelting Co. advanced its price of zinc ¼-cent to the basis of 11.50c a pound, Canadian currency, f.o.b. Montreal and Toronto.

Straits Tin Prices Decline

New York—Leading tin consumers are covering their future requirements cautiously, due to instability of the present market. Spot has been fluctuating between 74.75c and 75.50c, reflecting largely price movements in the Singapore market. General undertone of the market remains soft due to the present apparent over-production.

World stocks of tin at the end of December totaled 129,700 tons compared with 129,000 tons at the end of November. While world production of tin totaled 13,500 tons in January, consumption is maintaining a pace close to only 10,000 tons.

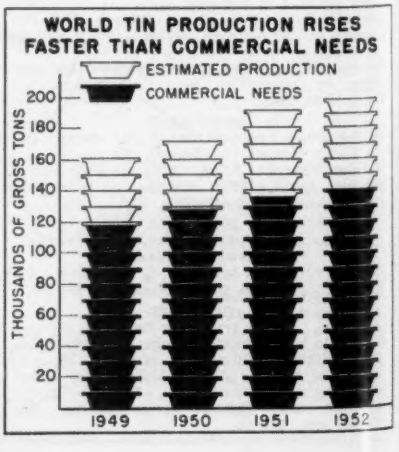
Buys Missouri Mining Property

Wallace, Idaho—Federal Mining & Smelting Co. has purchased 5000 acres of mining land and leases and three big mills in the Joplin, Mo., area. This constitutes a major move toward restoration of the Missouri sector of the Tri-State mining field. The company is re-entering the area for extensive re-examination of mineral reserves.

Federal Mining has purchased all the Missouri holdings around Joplin of George Potter, independent operator. It marks the first major move by one of the larger mining concerns to return to the area which has been dormant most of the last 25 years.

Copper Demand Heavy

New York—Reflecting the favorable outlook for industrial activity over the balance of this year, large copper consumers again are pressing sellers for coverage. Producers, however are cautious in making large forward commitments. While some improvement has been made in the copper mining labor picture, strikes that already have occurred will mean a substantial reduction in supplies during May and June. This is particularly true of Chilean metal.



NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 18.50c, Conn. Valley; Lake, 18.62½c, Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 17.25-18.25c; 88-10-2 (No. 215) 25.25c; 80-10-10 (No. 305) 21.75c; No. 1 yellow (No. 405) 14.75-16.00c.

Zinc: Prime western 10.50c, brass special 10.75c, intermediate 11.00c, East St. Louis; high grade 11.60c, delivered.

Lead: Common, 10.30c; chemical, 10.40c; corroding, 10.40c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, f.o.b. shipping point.

Secondary Aluminum: Piston alloys 16.00-16.50c; No. 12 foundry alloy (No. 2 grade) 15.50-16.00c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 17.25-17.75c; grade 2, 16.75-17.25c; grade 3, 15.25-15.75c; grade 4, 14.75-15.00c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt del., 75.37½c; April del. 75.12½c; May del. 75.00c; June del. 74.75c.

Antimony: American 99-99.8% and over but not meeting specifications below 24.50c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 25.00c; f.o.b. Laredo, Tex., for bulk shipments. Foreign, 99%: Chinese, English, Belgian, prompt, 23.00c, New York.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York $71-$74 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $2 del.; special or patented shapes, $2.15.

Cobalt: 97-99%, $1.80 per lb for 550 lb (keg); $1.80 per lb for 100 lb (case); $1.87 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 71.75c per oz.

Platinum: $66-$69 per ounce.

Palladium: $24 per troy ounce.

Iridium: $100 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; based on 18.50-cent copper.)

Sheet: Copper 32.18; yellow brass 28.69; commercial bronze, 95%, 32.10; 90%, 31.61; red brass, 85%, 30.60; 80%, 30.12; best quality, 29.58; nickel silver, 18%, 42.27; phosphor-bronze, grade A, 5% 50.90.

Rods: Copper, hot-rolled 28.03; cold-drawn 29.28; yellow brass free cutting, 23.19; commercial bronze, 95% 31.79; 90% 31.30; red brass 85% 30.29; 80% 29.81.

Seamless Tubing: Copper 32.22; yellow brass 31.70; commercial bronze 90% 34.27; red brass 85% 33.51; 80% 33.03.

Wire: Yellow brass 28.98; commercial bronze, 95% 32.39; 90% 31.90; red brass, 85% 30.89; 80% 30.41; best quality brass 29.87.

Copper Wire: Bare soft, f.o.b., eastern mills, 100,000 lb lots 22.55c, l.c.l. 23.17, c.l. 22.67; weatherproof, f.o.b. eastern mills, 100,000 lb lots 24.85, l.c.l. 25.60, c.l. 25.10; magnet, delivered, c.l. 28.50, 15,000 lb or more 28.75, l.c.l. 29.25.

ALUMINUM

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-24	36.8	33.4	39.5
0.008-0.0075	12-24	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R317-T4	—Hexagonal— 17S-T4
0.125	48.0	...	...
0.156-0.203	41.0	...	...
0.219-0.313	38.0	...	...
0.344	37.0	...	47.0
0.375	36.5	45.5	44.0
0.406	36.5	...	...
0.438	36.5	45.5	44.0
0.469	36.5	...	...
0.500	36.5	45.5	44.0
0.531	36.5	...	...
0.563	36.5	...	41.5
0.594	36.5	...	...
0.625	36.5	43.0	41.5
0.656	36.5	...	...
0.688	36.5	...	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	...	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	...	36.5
1.625	33.5	...	36.5
1.688-2.000	33.5	...	...
2.125-2.500	32.5	...	...
2.625-3.375	31.5	...	...

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $15.50 per cwt; add 50c per cwt, 10 sq ft to 140 sq ft. Pipe: Full coils, $15.50 per cwt. Traps and bends: List price plus 37%.

ZINC

Sheets, 16.00c f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 15.50c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 14.50c; over 12-in., 15.50c.

NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled, 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb, 35.00-36.00c.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 25.50c; 5 tons and over 26.00c; 1 to 5 tons, 26.50c; less than 1 ton, 27.00c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 28.84c; oval 28.34c; cast 26.87c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 46.50c f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,000 lb, 17.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 25.75c; over 250 lb, 24.75c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 100 lb, 64.00c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbl. 24.50c, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over 91.00c; 500 to 999 lb, 91.5c; 200 to 499 lb, 92.00c; less than 200 lb, 93.5c; ball, 1000 lb and over, 93.25c; 500 to 999 lb, 93.75c; 200 to 499 lb 94.25c; less than 200 lb, 95.75c f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 58.2c; 100 or 300 lb drums only, 100 to 500 lb, 49.9c; 600 to 1900 lb, 47.6c; 2000 to 9900 lb, 45.8c, f.o.b. Sewaren, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100-lb drums 38.00c, f.o.b. Niagara Falls, N. Y.; 40.50c f.o.b. Cleveland; 39.25c, del., Detroit and Philadelphia.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb 84.50c; more than 2000 lb, 82.50c, f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, 70.80c; 100 lb kegs 71.80c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb, f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	15.50	15.50	14.75
Yellow Brass	12.50	12.25	11.37½
Commercial Bronze			
95%	14.50	14.25	13.75
90%	14.25	14.00	13.50
Red brass			
85%	14.00	13.75	13.25
80%	13.62½	13.37½	12.87½
Best Quality (71-80%)	13.37½	13.12½	12.62½
Muntz Metal	11.50	11.25	10.75
Nickel, silver, 10%	14.50	14.25	7.25
Phos. bronze, A	16.75	16.50	15.50
Naval brass	12.00	11.75	11.25
Manganese bronze	12.00	11.75	11.12½

BRASS INGOT MAKERS' BUYING PRICES

(Cents per pound, delivered eastern refineries, carload lots)

No. 1 copper 15.25; No. 2 copper 14.25; light copper 13.25; composition red brass 12.50; radiators 10.00; heavy yellow brass 9.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 15.25; No. 2 copper 14.25; light copper 13.25; refinery brass (60% copper) per dry copper content 13.50-13.75.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and brass: Heavy copper and wire, No. 1 13.50-13.75; No. 2 12.50-12.75; light copper 11.50-11.75; No. 1 composition red brass 11.00-11.25; No. 1 composition turnings 10.25-10.50; mixed brass turnings 6.25-6.50; new brass clippings 10.50-11.00; No. 1 brass rod turnings 9.25-9.50; light brass 6.00-6.25; heavy yellow brass 7.25-7.50; new brass rod ends 9.75-10.00; auto radiators, unsweated 8.50-8.75; cocks and faucets, 8.50-8.75; brass pipe 9.00-9.25.

Lead: Heavy 8.00-8.25; battery plates 4.00-4.25; linotype and stereotype 8.75-9.00; electrotype 8.25-8.50; mixed babbitt 8.00-8.25.

Zinc: Old zinc 5.00-5.25; new die cast scrap 5.00-5.25; old die cast scrap 3.50-3.75.

Tin: No. 1 pewter 39.00-41.00; block tin pipe 60.00-62.00; No. 1 babbitt 30.00-32.00.

Aluminum: Clippings 2S 10.00-10.50; old sheets 7.00-7.50; crankcase 7.00-7.50; borings and turnings 4.00.

DAILY PRICE RECORD

1950	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Apr. 5-6	18.50	10.30	10.50	75.37½	17.00	24.50	40.00	71.75
Apr. 1	18.50	10.30	10.25	74.75	17.00	24.50	40.00	71.75
Apr. 4-6	18.50	10.30	10.50	74.75	17.00	24.50	40.00	71.75
Mar. Avg.	18.50	10.763	9.444	75.745	17.000	24.60	40.00	73.120
Mar. 31	18.50	10.30	10.25	74.75	17.00	24.50	40.00	71.75
Mar. 30	18.50	10.30	10.25	75.25	17.00	24.50	40.00	71.75
Mar. 29	18.50	10.30	10.25	76.00	17.00	24.50	40.00	72.75
Mar. 28	18.50	10.30	10.25	76.50	17.00	24.50	40.00	73.25
Mar. 27	18.50	10.30	10.25	77.12½	17.00	24.50	40.00	73.25
Mar. 23-25	18.50	10.30	10.00	77.75	17.00	24.50	40.00	73.25
Mar. 22	18.50	10.30	10.00	77.50	17.00	24.50	40.00	73.25
Mar. 21	18.50	10.30	10.00	77.12½	17.00	24.50	40.00	73.25
Mar. 20	18.50	10.30	10.00	76.25	17.00	24.50	40.00	73.25

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

IRON AND STEEL SCRAP

Consumer prices, except as otherwise noted, including brokers' commissions, as reported to STEEL, Apr. 6, 1950; gross tons except as noted. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Apr. 6	$28.83
Mar. 30	28.75
Mar. 1950	28.23
Apr. 1949	24.06
Apr. 1945	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 Heavy Melt.	*$32.00-32.50*
No. 2 Heavy Melt.	*29.00*
No. 1 Busheling	*32.00-32.50*
No. 1 Bundles	*32.00-32.50*
No. 2 Bundles	24.50-25.50
No. 3 Bundles	23.00-24.00*
Heavy Turnings	27.50-28.00
Machine Shop Turnings	22.50-23.00†
Mixed Borings, Turnings	22.50-23.00†
Short Shovel Turnings	26.00
Cast Iron Borings	25.00-26.00
Low Phos. Steel	*35.00-36.00*

Cast Iron Grades*

No. 1 Cupola Cast	*34.50-35.50*
No. 1 Machinery Cast	38.00-39.00
Charging Box Cast	31.00-32.00
Heavy Breakable Cast	29.00-30.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	*34.00-34.50**
Axles	35.00-36.00
Rails, Random Lengths	35.50-36.00
Rails, 2 ft. and under	39.00-40.00
Rails, 18 in. and under	40.00-41.00
Railroad Specialties	*35.50-36.50*
Angles, Splice Bars	37.00-38.00*

* Nominal.
† Crushers' buying prices.

CLEVELAND

No. 1 Heavy Melt. Steel	$29.00-29.50
No. 2 Heavy Melt. Steel	27.00-27.50
No. 1 Busheling	29.00-29.50
No. 1 Bundles	29.00-29.50
No. 2 Bundles	23.00-23.50
Machine Shop Turnings	19.00-19.50
Mixed Borings, Turnings	22.00-22.50
Short Shovel Turnings	22.00-22.50
Cast Iron Borings	22.00-22.50
Low Phos.	30.00-30.50

Cast Iron Grades

No. 1 Cupola	42.00-43.00
Charging Box Cast	38.00-39.00
Stove Plate	35.50-36.50
Heavy Breakable Cast	32.00-32.50
Unstripped Motor Blocks	31.00-32.00
Brake Shoes	28.50-29.50
Clean Auto Cast	42.50-43.50
No. 1 Wheels	36.50-37.00
Burnt Cast	33.00-33.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.50-33.00
R.R. Malleable	38.50-39.00
Rails, 3 ft and under	41.00-42.00
Rails, 18 in. and under	43.00-44.00
Rails, Random Lengths	38.00-39.00
Cast Steel	34.00-35.00
Railroad Specialties	35.00-35.50
Uncut Tires	36.00-37.00
Angles, Splice Bars	41.00-41.50

VALLEY

No. 1 Heavy Melt. Steel	$32.50-33.00
No. 2 Heavy Melt. Steel	30.00-31.00
No. 1 Bundles	32.50-33.00
No. 2 Bundles	25.50-26.50
Machine Shop Turnings	22.00-23.00
Short Shovel Turnings	24.50-25.00
Cast Iron Borings	24.50-25.00
Low Phos.	33.50-34.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	33.00-33.50

PHILADELPHIA

No. 1 Heavy Melt. Steel	$25.00-25.50
No. 2 Heavy Melt. Steel	23.00-23.50
No. 1 Busheling	*24.00-24.50*
No. 1 Bundles	25.00-25.50
No. 2 Bundles	19.50-20.00
Machine Shop Turnings	18.00
Short Shovel Turnings	19.50
Mixed Borings, Turnings	17.00
Low Phos. Punchings and Plate, elec. fur. grade	*30.00*
Low Phos. Plate, 5 ft & under	29.00
Elec. Furnace Bundles	26.50
Heavy Turnings	*25.50*
No. 1 Chemical Borings	*30.00*
Knuckles and couplers	*31.00-32.00*
Steel car wheels	30.00

Cast Iron Grades

No. 1 Cupola Cast	32.00-33.00
No. 1 Machinery Cast	*38.00*
No. 1 Yard Cast	30.00
Charging Box Cast	*35.00-36.00*
Heavy Breakable Cast	*35.00-36.00*
Unstripped Motor Blocks	25.00
Clean Auto Cast	*38.00*
No. 1 Wheels	39.00
Malleable	39.00-40.00

CINCINNATI

No. 1 Heavy Melt. Steel	*$28.00*
No. 2 Heavy Melt. Steel	23.00
No. 1 Busheling	*28.00*
No. 1 Bundles	*28.00*
No. 2 Black Bundles	23.00
No. 3 Bundles	18.00
Machine Shop Turnings	*15.00*
Short Shovel Turnings	*18.00*
Mixed Borings, Turnings	*17.00*
Cast Iron Borings	*18.00*

Cast Iron Grades

No. 1 Cupola Cast	*40.00*
Charging Box Cast	36.00
Stove Plate	*29.00*
Heavy Breakable Cast	*33.00*
Unstripped Motor Blocks	*24.00*
Brake Shoes	*23.00*
Clean Auto Cast	*40.00*
Drop Broken Cast	*43.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	*31.00*
R.R. Malleable	*34.00*
Rails, Rerolling	*37.00*
Rails, Random Lengths	*35.00*
Rails, 18 in. and under	*43.00*

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 2 Heavy Melt. Steel	$23.00-23.50
No. 1 Bundles	27.00-27.50
No. 2 Bundles	20.00-21.00
No. 1 Busheling	26.00-26.50
Machine Shop Tunrings	16.50-17.00
Mixed Borings, Turnings	16.50-17.00
Short Shovel Turnings	19.00-19.50
Cast Iron Borings	19.00-19.50
Punchings & Plate Scrap	27.00-27.50

Cast Iron Grades

No. 1 Cupola Cast	33.00-34.00
Heavy Breakable Cast	29.00-30.00
Clean Auto Cast	39.00-40.00

BUFFALO

No. 1 Heavy Melt. Steel	$29.50-30.00
No. 2 Heavy Melt. Steel	27.50-28.00
No. 1 Bushelings	27.50-28.00
No. 1 Bundles	28.50-29.00
No. 2 Bundles	26.00-26.50
Machine Shop Turnings	18.00-18.50
Mixed Borings, Turnings	19.00-19.50
Cast Iron Borings	19.00-19.50
Short Shovelings	19.50-20.00
Low Phos.	30.50-31.00

Cast Iron Grades

No. 1 Machinery	36.50-37.00
No. 1 Cupola	32.50-33.50
Stove Plate	31.50-32.50
Malleable	32.50-33.00

Railroad Scrap

Rails, 2 ft. and under	38.00-39.00
Scrap rails	35.00-35.50
Specialties	33.00-34.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$22.00-23.00*
No. 2 Heavy Melt. Steel	*18.50*
No. 1 Busheling	*18.50-19.00*
No. 1 Bundles	*22.00-23.00*
No. 2 Bundles	16.00-16.50
Machine Shop Turnings	*13.00-13.50*
Mixed Borings, Turnings	*13.00-13.50*
Short Shovel Turnings	*14.00-14.50*
Punchings & Plate Scrap	23.50-24.00
Low Phos. Plate, 5 ft & under	23.50-24.00
Elec. Furnace Bundles	21.50-22.00

Cast Iron Grades

No. 1 Cupola Cast	26.00-26.50
No. 1 Machinery	27.00-28.00
Charging Box Cast	*27.00-28.00*
Heavy Breakable	*27.00-28.00*
Unstripped Motor Blocks	20.00
Malleable	34.00

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$20.50-21.00*
No. 2 Heavy Melt. Steel	*17.50-18.00*
No. 1 Bundles	*20.00-21.00*
No. 1 Busheling	*19.50-20.00*
Machine Shop Turnings	*11.50-12.00*
Mixed Borings, Turnings	*11.00-11.50*
Short Shovel Turnings	13.00-13.50
Bar Crops and Plate	21.00-22.00
Punchings & Plate Scrap	21.00-22.00
Chemical Borings	19.00-19.50

Cast Iron Grades

No. 1 Cupola Cast	27.50-30.50
Mixed Cast	21.00-22.00
Heavy Breakable Cast	24.50-25.50
Stove Plate	21.50-22.50
Unstripped Motor Blocks	17.50-18.50

CHICAGO

No. 1 Heavy Melt. Steel	$29.00
No. 2 Heavy Melt. Steel	27.00
No. 1 Bundles	28.00*
No. 2 Bundles	25.00
Machine Shop Turnings	18.00-19.00
Mixed Borings, Turnings	20.50-21.00
Short Shovel Turnings	21.00
Cast Iron Borings	20.00-21.00
Low Phos.	30.50-31.50
Elec. Furnace Bundles	29.00-30.00
Heavy Turnings	23.00-24.00
Cut Structurals	30.00-30.50

Cast Iron Grades

No. 1 Cupola Cast	*40.50-41.50*
Clean Auto Cast	42.00-43.00
No. 1 Wheels	36.00-37.00
Stove Plate	*32.50-33.50*

Railroad Scrap

No. 1 R.R. Heavy Melt.	30.00-30.50
Malleable	42.00-43.00
Rails, Rerolling	*46.00-47.00*
Rails, Random Lengths	*36.00-37.00*
Rails, 2 ft and under	41.00-42.00
Rails, 18 in. and under	42.00-43.00
Railroad Specialties	32.00-33.00
Angles, Splice Bars	38.00-39.00

* Mar. 27 price also was $28.

BIRMINGHAM

No. 1 Heavy Melt. Steel	$24.00
No. 2 Heavy Melt. Steel	22.00
No. 1 Busheling	22.00
No. 2 Bundles	20.00
Machine Shop Turnings	19.50
Mixed Borings, Turnings	17.00
Short Shovel Turnings	23.00
Cast Iron Borings	19.00
Bar Crops and Plate	27.00-28.00
Cut Structurals	27.00-28.00

Cast Iron Grades

No. 1 Cupola Cast	35.00
Stove Plate	30.00
No. 1 Wheels	30.50-31.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	25.00-26.00
R.R. Malleable	nominal
Rails, Rerolling	33.00-35.00
Rails, 3 ft and under	nominal
Angles and Splice Bars	nominal

ST. LOUIS

No. 1 Heavy Melt. Steel	*$29.00-30.00*
No. 2 Heavy Melt. Steel	24.50-25.50
Machine Shop Turnings	14.00-15.00
Short Shovel Turnings	18.00-19.00

Cast Iron Grades

No. 1 Cupola Cast	*36.00-37.00*
Charging Box Cast	32.00-33.00
Heavy Breakable Cast	30.00-31.00
Brake Shoes	28.00-29.00
Clean Auto Cast	36.00-38.00
Burnt Cast	29.00-30.00

Railroad Scrap

R.R. Malleable	33.00-34.00
Rails, Rerolling	42.00-44.00
Rails, Random Lengths	*33.00-34.00*
Rails, 3 ft and under	37.00
Uncut Tires	28.00-29.00
Angles, Splice Bars	35.00-36.00
Railroad Specialties	31.00-32.00

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No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	13.00
Machine Shop Turnings	9.00

Cast Iron Grades

No. 1 Cupola Cast	30.00-35.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Random Lengths	20.00

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No. 1 Heavy Melt. Steel	$18.00
No. 2 Heavy Melt. Steel	18.00
No. 1 Busheling	15.50
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	13.00
Mixed Borings, Turnings	13.00
Punchings & Plate Scrap	27.50
Cut Structurals	27.50

Cast Iron Grades

No. 1 Cupola Cast	*25.00-30.00*
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Unstripped Motor Blocks	18.00
Malleable	25.00
Brake Shoes	20.00
Clean Auto Cast	27.50
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Railroad Malleable	25.00
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No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	5.00
Mixed Borings, Turnings	5.00
Punchings & Plate Scrap	26.00

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No. 1 Cupola Cast	*34.00*

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Rerolling	*30.00*

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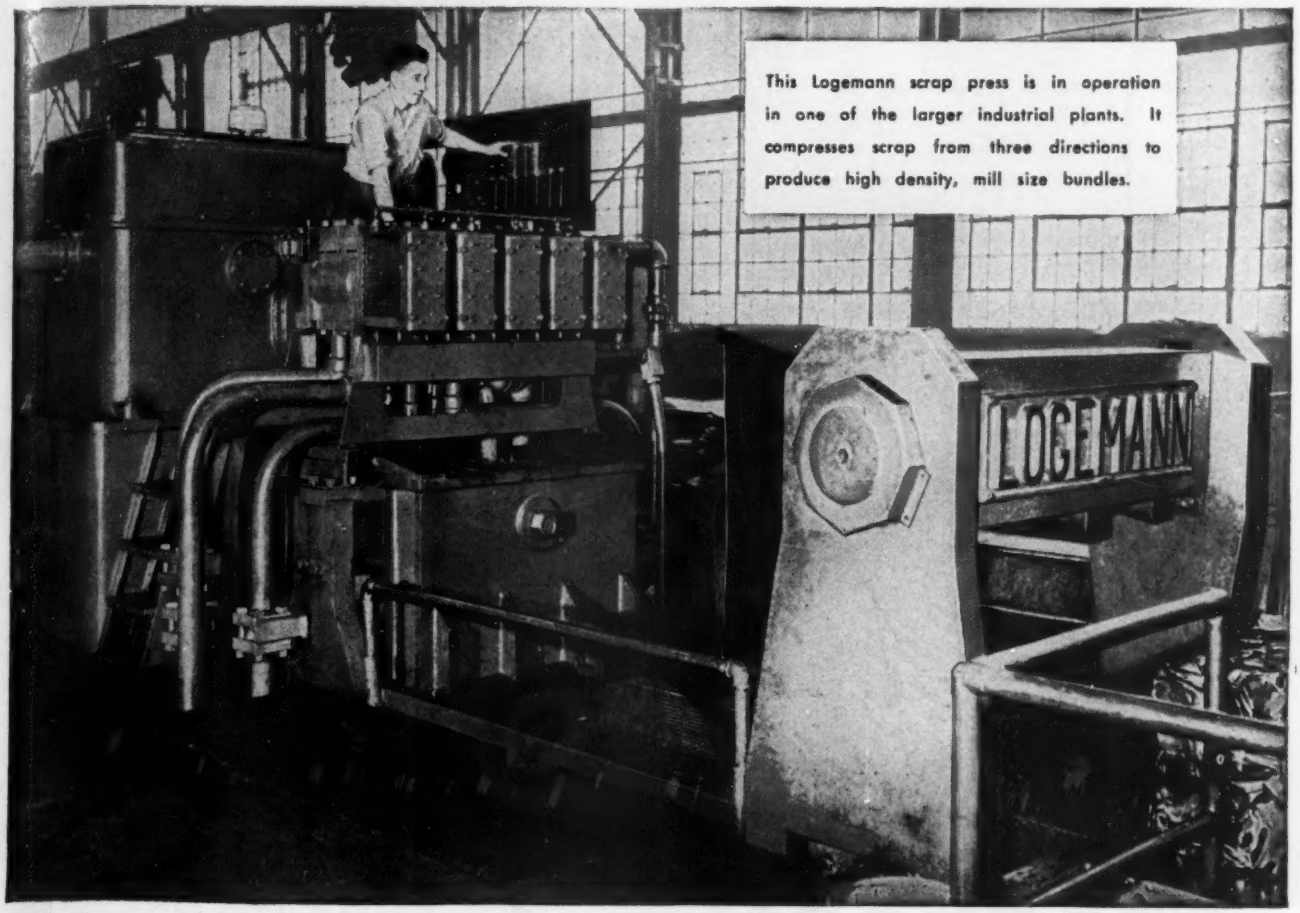
(Delivered prices)

Heavy Melt.	$24.00
No. 1 Bundles	24.00
Mechanical Bundles	22.00
Mixed Steel Scrap	20.00
Mixed Borings, Turnings	18.00
Rails, Remelting	24.00
Rails, Rerolling	27.00
Busheling	18.50
Bushelings new factory, prep'd	22.00
Bushelings new factory, unprep'd	17.00
Short Steel Turnings	18.00

Cast Iron Grades

Cast	40.00-43.00*

* F.o.b, shipping point.



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Triple Compression..
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. . . are built in a large range of sizes to meet specific conditions. Let Logemann's engineering service help you arrive at the most efficient and economical way of handling your scrap.

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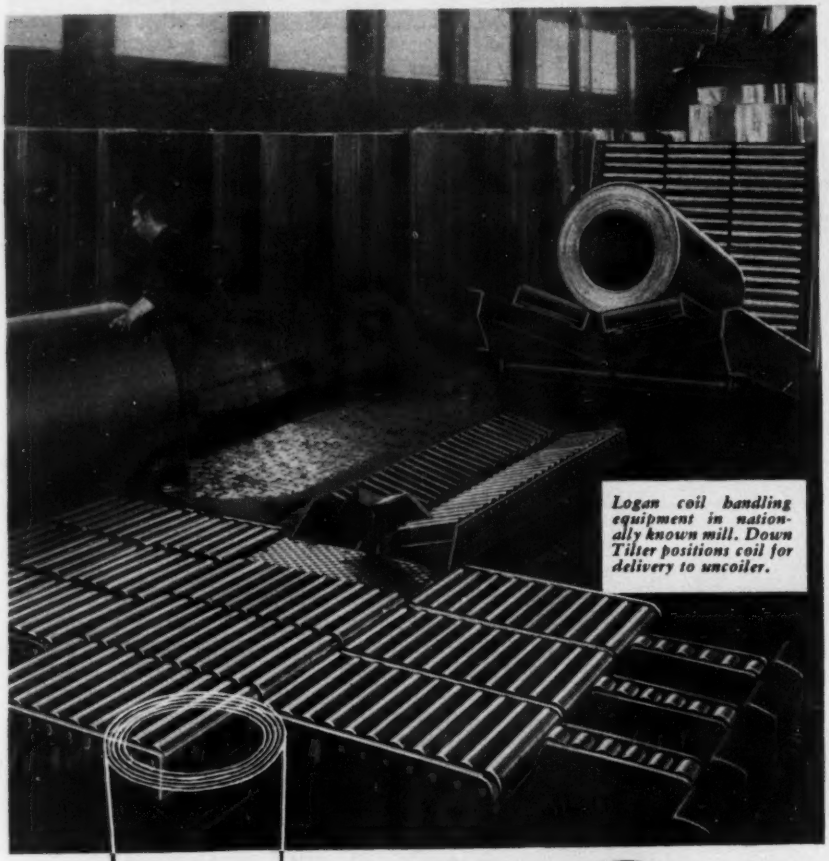

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LOGAN CO., 535 CABEL ST., LOUISVILLE, KY.

Sheets Strip . . .

Sheet and Strip Prices, Page 131 & 132

Boston—Openings for second quarter on nonintegrated cold strip mills are rare; sheet schedules are filled for the period.

New York—Tonnage of cold-rolled sheets offered by a midwestern producer for delivery here over the next 8 to 10 weeks was quickly snapped up. The offer gave rise to speculation as to whether certain strike-bound auto plants were holding up shipments. Pressure for tonnage is as strong as ever. Gray market cold-rolled sheets are offered as high as 7 cents per lb. Some strip in band sizes is being imported at prices well below domestic levels.

Philadelphia—While the trade is speculating on how much longer pressure for sheets will continue, there are no signs of early abatement. Conversion deals are increasing as are gray market transactions.

Pittsburgh—Production loss due to the steel and coal strikes has unbalanced supply and demand comparable to the early postwar period. Some trade authorities contend that given six months uninterrupted production the increased cold-rolled capacity will be more than sufficient to meet anticipated expanding requirements over the next five years.

Cleveland — Consumer pressure for sheets is unabated. Mill backlogs now are so heavy large corryover into third quarter appears certain. It is figured second quarter arrearages will at least equal one month's production. This, coupled with loss of output in July due to vacation shutdowns, supports view heavy demand for flat-rolled will prevail into the fall.

Cincinnati—Pressure for sheets is featured by broadness of demand. Automotive needs are heavy, stove manufacturers are making seasonal runs, and other household equipment is active. Inquiries extend into third quarter.

Chicago—Change in hot-rolled strip extras was affected Apr. 1 by Inland Steel Co. Two departures from the previous card are significant. The first concerns extra for exclusion of random shorts in cut lengths over 120 inches. Previously taking a 10 per cent additional charge, the new card establishes the charge at a flat 25 cents per 100 pounds. This represents a $5 per ton reduction in price of dead length material.

The other change is separation into two tables of size extras, one for mill edge, the other for cut edge. Previously it was necessary to add cut edge extras, where they applied, to mill edge extras. No change in price of material is involved.

Extras for restrictive mechanical test requirements and for decarburization measurement, which formerly were available on application, are each now listed at 10 cents.

Easing in sheet and strip supply may develop in third quarter. One steel authority here thinks the spread between supply and demand already has shrunk to an estimated 10 per cent. There is some speculation as to how long it will be necessary for the mills to maintain quotas with buyers tending to show a little more

caution in ordering.

St. Louis—March output of cold-rolled sheets and hot strip was record-breaking in March here. Shipments by Granite City Steel Co. were the second best since the war.

Birmingham — Despite capacity production of sheets, little improvement in supply is noted. Demand remains at high level. Especially concerned are warehouses. Tighter allocations are in prospect.

Los Angeles — Heavy demand coupled with slim supplies of hot-rolled strip has caused producers of cold-rolled products to close books for second quarter.

San Francisco—Pressure for flat-rolled products is increasing. Supplies are tightening. Reduced shipments from eastern mills is a major factor.

Tubular Goods . . .

Tubular Goods Prices, Page 134

Boston—Bulk of larger pipe requirements for housing projects are direct shipments. Stock sales for distributors are seasonally low. The latter are placing light orders with mills and turning down full allocations, notably buttweld for May delivery. Most are taking overdue tonnage. In fact there is pressure for such shipments. Springfield arsenal closes Apr. 15 on 118,240 ft of steel tubing. Cast pipe buying is up.

New York—Merchant pipe trade is expanding. Jobbers are pressing for tonnage in addition to their quotas. Oil country needs are heavy. New requirements are anticipated for extension into New England of the major pipeline system leading into New York from Texas. Utilities are specifying briskly. Tubing needs lag.

Seattle—Demand for cast iron pipe is slow and sporadic. Keener competition from other types of water mains is evident. Cast iron pipe sellers have well rounded warehouse stocks and offer prompt deliveries.

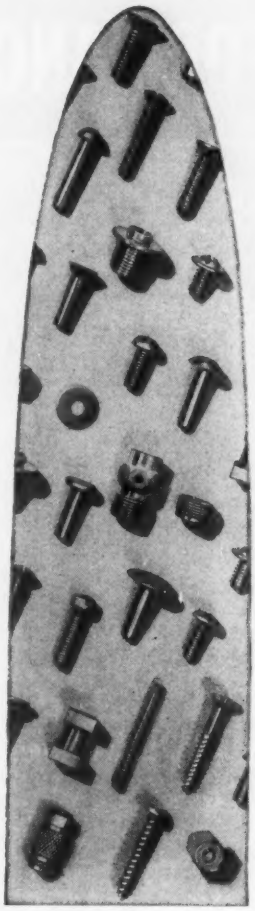
Steel Bars . . .

Bar Prices, Page 131

Boston—Although quoting $1 per ton higher f.o.b. or 4.95c mill, Bethlehem, Pa., contract for close to 1000 tons of bars for remelting at Watertown, Mass., arsenal went to the producers at that point over 4.90c Buffalo. The answer is freight costs, 53.00c per 100 lbs Bethlehem to Boston compared with 63.00c from Buffalo. Carbon bar buying is up slightly, notably hot-rolled in smaller sizes, by forge shops and converters. Improvement in alloys is confined to government shops, Springfield armory inquiring for 245 tons of hot and cold-rolled, and 27,500 chromium-molybdenum-vanadium barrel blanks, the latter Apr. 14.

New York—Hot carbon bar deliveries have been placed on an allocation basis by at least two additional mills. One mill has placed even hot alloy bars under allocation.

Philadelphia—Hot carbon bar demand is heavier and more diversified. Railroad specifications are more lively. More tonnage is coming out also from builders of agricultural equipment, textile and paper mill machin-



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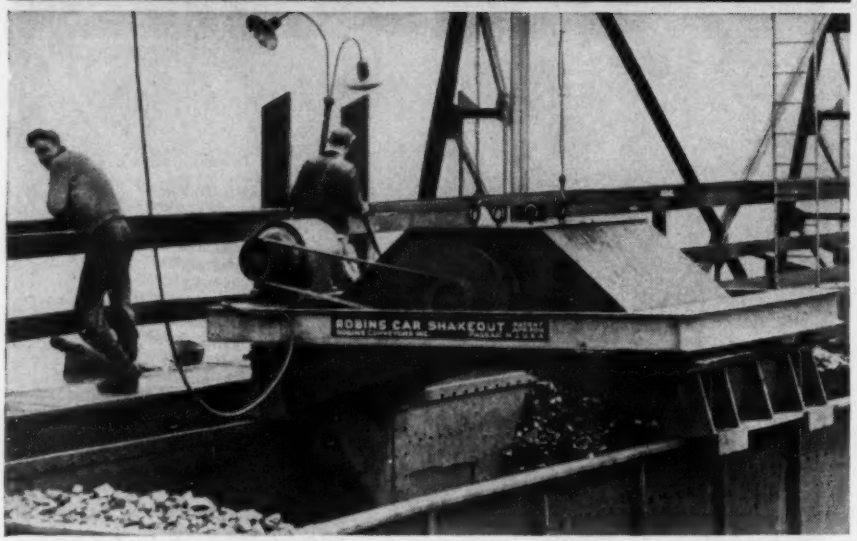

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The Hewitt-Robins Car Shakeout practically eliminates demurrage charges. It cuts the unloading crew from five or six to two—even one. It ends damage to cars, danger to workmen . . . makes a tedious, expensive operation quick, simple and safe.

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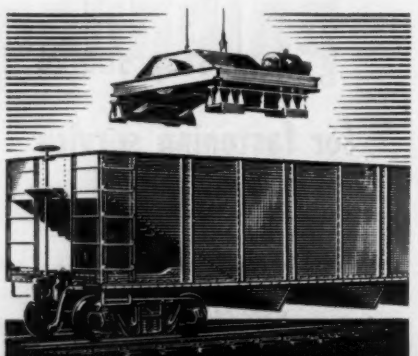

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ery and trucks. Producers of large forgings are experiencing a pickup.

Pittsburgh—Quota distribution of hot-rolled carbon bars has been extended to include the entire size range. Immediately following termination of the coal strike quotas were applicable only on sizes under 3 inches.

Cleveland—Buyers are doing more shopping around in filling urgent carbon bar requirements. Supplies have tightened noticeably. Shipments extend through second quarter on desired sizes. Cold-drawn and alloy bar deliveries are more extended also. Cold-finishers report difficulty getting all the hot bars they need.

Chicago—Mills expect to stay close to delivery promises on most bar orders this quarter. Books of some interests are full through June. Carryover into that month is not as great in bars as in flat-rolled.

Plates . . .

Plate Prices, Page 131

Boston—Fabricators are not buying much beyond backlog commitments with small tank volume moderately heavier. Prospective tonnage for oil storage terminals, Portland, Me., and Saugus, Mass., is substantial. Two more 36-in. electrically welded pipe lines, Lynn-Marblehead, Mass., for the Metropolitan District Commission, Boston, take close to 2000 tons in addition to 5600 tons being fabricated by a Holyoke, Mass., shop.

New York—Oil refinery requirements continue to decline, despite activity in line pipe work and in one or two other phases of the oil industry. Eastern mills are experiencing further improvement in general demand, notably in specifications for underground fuel oil storage tanks, road building and agricultural equipment and heavy building construction. Railroad car requirements are stepping up gradually.

Philadelphia—With Pittsburgh and midwestern mills booked well ahead, more plate tonnage is being diverted to eastern producers, and their deliveries, in turn, are becoming more extended.

Chicago — Plate supply is stringent here due to heavy demands for large diameter pipe manufacture and somewhat better inquiry from car shops.

Birmingham—Slight headway is being made toward catching up with the heavy demand for plates. Moderate stockpiles are being accumulated by larger users.

Los Angeles—Plate inquires are increasing, but actual sales remain light. An eastern mill is quoting May delivery on 3/16 in. and over. Competition among fabricators is extremely keen.

San Francisco—Demand is spotty and supplies ample. Offerings of European plates have unsettled the market slightly.

Seattle—Small plate shops report an upturn in business, some of it seasonal work in Alaska. Order backlogs are not large.

Wire . . .

Wire Prices, Page 133

Boston—Most wire mill capacity is filled for second quarter. Exceptions include: Cold heading wire, schedules filled beyond May; music wire, supplies ample; nails, some producers dropping out of competition, it is reported.

Pittsburgh—Wire products distribution in some instances is on mill quota basis or district office allotment. While certain sellers have openings in May schedules on manufacturers and merchant wire items, others are booked into July on 6-gage and larger manufacturers' wire. Auto demand for mechanical spring wire is strong though a cutback is noted in Chrysler shipments. Fastener trade is taking more cold-heading steel. Fence and barbed wire bookings extend through May. Nail order backlogs run 6 to 8 weeks.

Birmingham—Spring demand for wire products has started. Fencing and nails are especially in demand. Slackening in baling wire is noted but manufacturers' wire is moving actively.

Structural Shapes . . .

Structural Shape Prices, Page 131

Boston—All but one of 27 highway bridges included in the tentative 1950 Connecticut program are of medium or small-tonnage, except a span over the Housatonic river, Newton-Southbury, estimated to cost $1 million. Total estimated cost of the program is $10 million. Structural steel for Massachusetts public works will be heavier this year than in 1949.

New York—Reflecting increasing structural activity, shape deliveries are more extended. One large producer has placed this material on allocation, and is accepting no new orders under ten weeks. Some mills can deliver standard shapes within six weeks. Public work dominates demand.

Philadelphia—Structural activity has reached a new high for the year and still higher levels are anticipated. Bridgework dominates, although a good amount of other public work is being figured. Private work is lagging as is industrial construction. Shape deliveries are extended, around seven to ten weeks.

Cleveland—Spring pickup in building activity is stimulating demand for structurals. Numerous projects are pending, most of them small but also including several proposals for large apartments. Most recent sizable projects include a plant building for Timken Roller Bearing Co.; dormitory for Case Institute of Technology at Cleveland; apartment building, costing $1,250,000, in Euclid, O.; apartment building in Shaker Heights, O., costing $3 million; office and service building for White Sewing Machine Co., Cleveland.

Chicago—Scramble by most fabricators for new contracts continues. Much new work is in small commercial structures and apartment buildings. Little new industrial activity is reported. Plain material, with the

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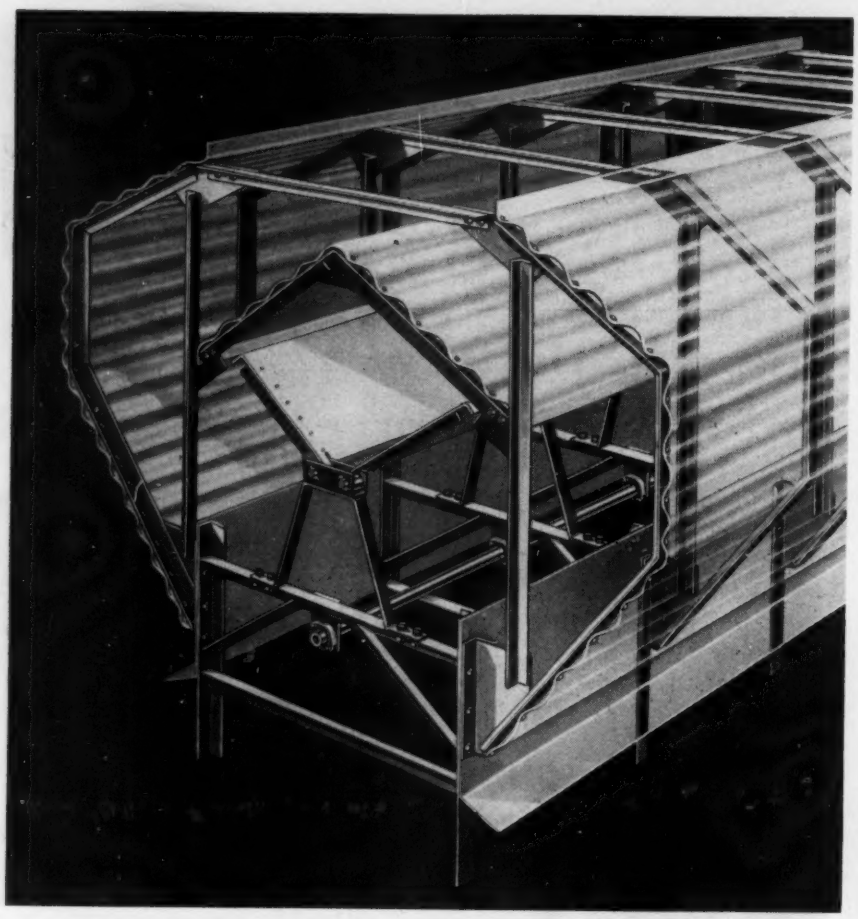

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exception of wide flange beams, is not posing a problem for most shops.

San Francisco—Some increase is shown in small projects. Seasonal spurt in building is expected to bring out new orders soon.

Seattle—Fabricators report much work in prospect and expect improved demand in second quarter.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 131

Boston—Reinforcing bar buying for bridges and highways is heavy. New work up for estimates maintains pending volume. Contractor estimates for bars in place average slightly lower and they are frequently successful in buying bars below original quotations. Outstanding pile inquiry is for 10,300 tons for a Mystic terminal pier.

Chicago—Good flow of medium and small sized inquiries is noted, but sufficient work is not available to keep all fabricators at capacity. Bar supply is ample, material in all sizes being offered for relatively prompt delivery. Outstanding pending project is for Nash at Kenosha, reinforcing requirements being 1000 tons.

Los Angeles—High level construction is attracting San Francisco mills and fabricators into the local market. Mill prices are steady, but intense competition is resulting in considerable price-cutting among fabricators.

Seattle—Inquiry for small tonnages of reinforcing bars is strong. Order backlogs are large.

Exporter Adopts C.I.F. Pricing

New York—United States Steel Export Co. is selling on the basis of c.i.f. to most foreign destinations. This action, effective Mar. 31, was prompted by general world conditions and the availability of transport.

Since the c.i.f. prices are the former seaboard prices plus actual transportation charges to destination, the delivered cost to the buyer remains unchanged. The c.i.f. delivery facilitates sale for both the buyer and seller.

Conditions in some countries make c.i.f. sales impractical. Hence, to such countries sales continue to be made f.o.b. mill with railroad freight included to United States ports of exit.

Semifinished Steel . . .

Semifinished Prices, Page 131

Pittsburgh—Producers with excess ingot capacity are selling rerolling ingots around $60 per net ton for conversion. Others are helping sheet and strip customers by shipping semifinished to mills with excess hot and cold-reduction capacity. Sellers have placed semifinished on quota basis. Current offerings of sheet bars range up to $75 per ton, in contrast to $55 last fall. Resumption of ingot operations at former Toronto, O., plant of Follansbee Steel Corp. is under consideration.

Chrome Ore Prices Revised

New York—South African Transvaal chrome ore prices have been adjusted with 45 per cent no ratio now $17.30-18.30 per gross ton, f.o.b. cars, eastern ports, against $17-$18; 48 per cent no ratio at $26, compared with $26-$27.

Pig Iron . . .

Pig Iron Prices, Page 130

Boston—Overall foundry melt averages between 50 and 60 per cent, but tonnage melted by larger consumers is close to 100 per cent of prewar capacity. Ratio of scrap to iron with some shops is high. Foundry activity is up slightly, but most users are buying close to requirements. One purchase of basic, 1000 tons by a steel plant, was made at saving of better than $7 per ton under usual source of supply.

New York—Pig iron shipments are increasing in line with higher operations at district foundries. Prospects are castings production here in April will be best in months, although business lags behind that in certain adjacent districts. Foreign offerings continue. Prices on foreign iron are around $41-$42, eastern ports.

Philadelphia — Pig iron sellers report an appreciable pickup in demand in basic and foundry grades. However, there are no indications of supply stringency.

Pittsburgh — Heavy demand for foundry iron is noted from electrical appliance, radiation and enamelware industries. Slight upturn in operations is developing among steel foundries serving the railroad industry. Production schedules at most jobbing foundries remain depressed, averaging only three days per week. Merchant iron output is in close balance with consumption, most users reporting little opportunity to replenish stocks. Fort Pitt Malleable Iron Co. permanently discontinued operations Mar. 31.

Carnegie-Illinois Steel Corp. blew in No. 6 blast furnace at its Duquesne Works, Apr. 4, making 43 out of 47 units active in this district, highest since early 1949.

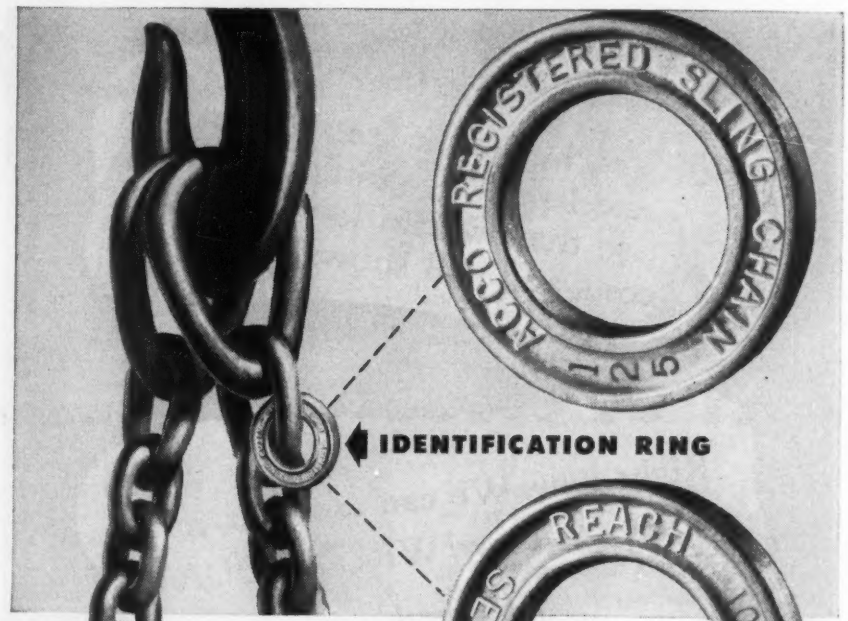
Cleveland—Merchant iron supply is adequate for current needs, but there is no excess tonnage. Foundries are specifying actively on contracts. They are replenishing stocks. In addition, new business coming to them from machine tool builders, the building field, agricultural implement, road building and similar heavy equipment makers is stimulating demand for iron.

Cincinnati—Expansion in foundry melt has slowed down in absence of active demand for machine tool castings.

St. Louis—Pig iron deliveries are lagging a week to 10 days behind schedules as foundries show first signs of real life in several months. Iron output since end of the coal strike has been at capacity.

Birmingham—Cast iron pipe plants are operating considerably below peak levels but pig iron output still runs behind district demand.

San Francisco—First shipment of



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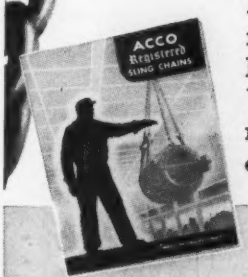

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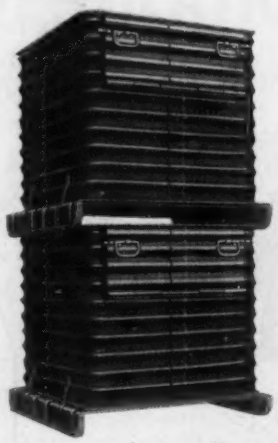

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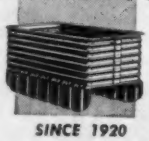

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Seattle—European pig iron is being purchased here at about $7 per ton under the domestic market.

Iron Ore . . .

Iron Ore Prices, Page 135

Cleveland—Vessels are beginning to move on the Great Lakes despite bad ice conditions. But it will be past mid-month before the ore fleet really begins moving to the head of the lakes. Meanwhile, carriers are being readied for a 75 to 80 million ton ore shipping season. An important development in the ore trade last week was the breaking of ground at Virginia, Minn., by the Oliver Iron Mining Co. for its experimental 1-million ton taconite agglomerating plant.

Inland Steel Co. has arranged with Steep Rock Iron Mines Ltd. for exploration of one of several remaining undeveloped iron ore areas on Steep Rock property in Canada.

Ore shipments by Steep Rock Iron Mines last year totaled 1,134,261 tons. The company has sold its entire 1950 tonnage at 55 cents per ton above 1949 prices.

Tin Plate . . .

Tin Plate Prices, Page 132

Pittsburgh—Sellers anticipate full production schedules through third quarter. There is prospect 1950 output will estabilsh new record. In addition to new electrolytic lines, modernization of cold-reduction mill facilities should make more steel available for tinning. First of 25 automatic can assembly lines at the Continental Can Co.'s new plant in West Mifflin township is expected to commence operation this month.

Ferroalloys . . .

Ferroalloy Prices, Page 135

Rock Island, Wash. — Keokuk Electro Metals Co. now is operating the war-built ferroalloys plant here. Operations were suspended nine months ago.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 134

Pittsburgh — Improved supply of oven coke eased pressure for beehive grades. But some steel producers continue to take beehive to augment stocks. Some weakness is noted in coal prices with reduction of 50 to 75 cents a ton for Wise county domestic dealer grades and 20 cents for by-product oven grades.

Cleveland—Oven foundry coke is in freer supply, but foundries are encountering difficulty in filling all their needs. Some must shop around to greater extent than heretofore. Needs are rising with castings demand up. Speculation over Ford's coke requirements for the engine plant it is building here continues. Suppliers hesitate to assume such a

large commitment, 800 tons daily, not desiring to "put all their eggs in one basket."

Birmingham — Alabama By-Products Corp. increased coke prices 45 cents per ton, effective Apr. 1.

Scrap . . .

Scrap Prices, Page 138

Pittsburgh—Scrap is stronger with brokers paying up to $32.50 for No. 1 heavy melting. Price advances at remote points shipping to this district have reached levels which indicate a delivered price, Pittsburgh mills, above $33. Latest railroad heavy melting was purchased for a Valley mill at $34.60, up about $1. A "token" tonnage of dealer scrap sold last week at $32. Considerable tonnage of customer heavy melting steel scrap is moving at $32.50.

Boston—Steelmaking scrap is more active and prices are firmer. Heavy melting steel is $1 to $1.50 a ton higher with the spread between the two grades narrowing.

New York—Brokers' buying prices are higher on Nos. 1 and 2 heavy melting steel, No. 1 bundles, No. 1 busheling, machine shop turnings, mixed borings and turnings, short shovel turnings, charging box and heavy breakable cast.

Philadelphia—There is little new buying of open-hearth steel, but consumer interest is active and the market strong. It is doubtful if under $25.50, delivered, can be done on No. 1 heavy melting steel. Consumers have placed a few relatively small orders for highly selected material for as much as $26, but momentarily the heavy melting market is unchanged.

Cleveland—Scrap sellers are waiting for mills to re-enter the market. Large tonnages of industrial and railroad scrap are being received on old contracts to maintain the high ingot production rate. Stocks held by foundries are at safe level.

Detroit — Market is strong but quiet, following recent price flurry. No important automotive lists were up for bids last week, although Hudson sold a tonnage of small bundles, reportedly moved to dock for shipment to Bethlehem Steel.

Buffalo—Prolonged stalemate in steelmaking scrap was broken last week by sales aggregating over 25,000 tons at prices averaging $1.50 higher than the previous business. New prices were: $29.50-30 for No. 1 heavy melting, $27.50-28 for No. 2 heavy melting and busheling, No. 1 bundles, $28.50-29 and No. 2 bundles $26-26.50.

Cincinnati — Scrap prices have moved $1 to $3 a ton higher on sales. Brokers and dealers believe higher bids on conversion deals were a major factor in the rise. Plenty of tonnage is coming out to satisfy district melters.

Chicago—Some scrap interests here think higher prices are in prospect for open hearth material and speculators are bidding above $30 for No. 1 steel. Bundle rejections are few, but may indicate material which has been stored for a long period is moving. One mill has relaxed its standards on bundle quality by allowing up to 15 per cent galvanized content. Cast market is weaker, good material

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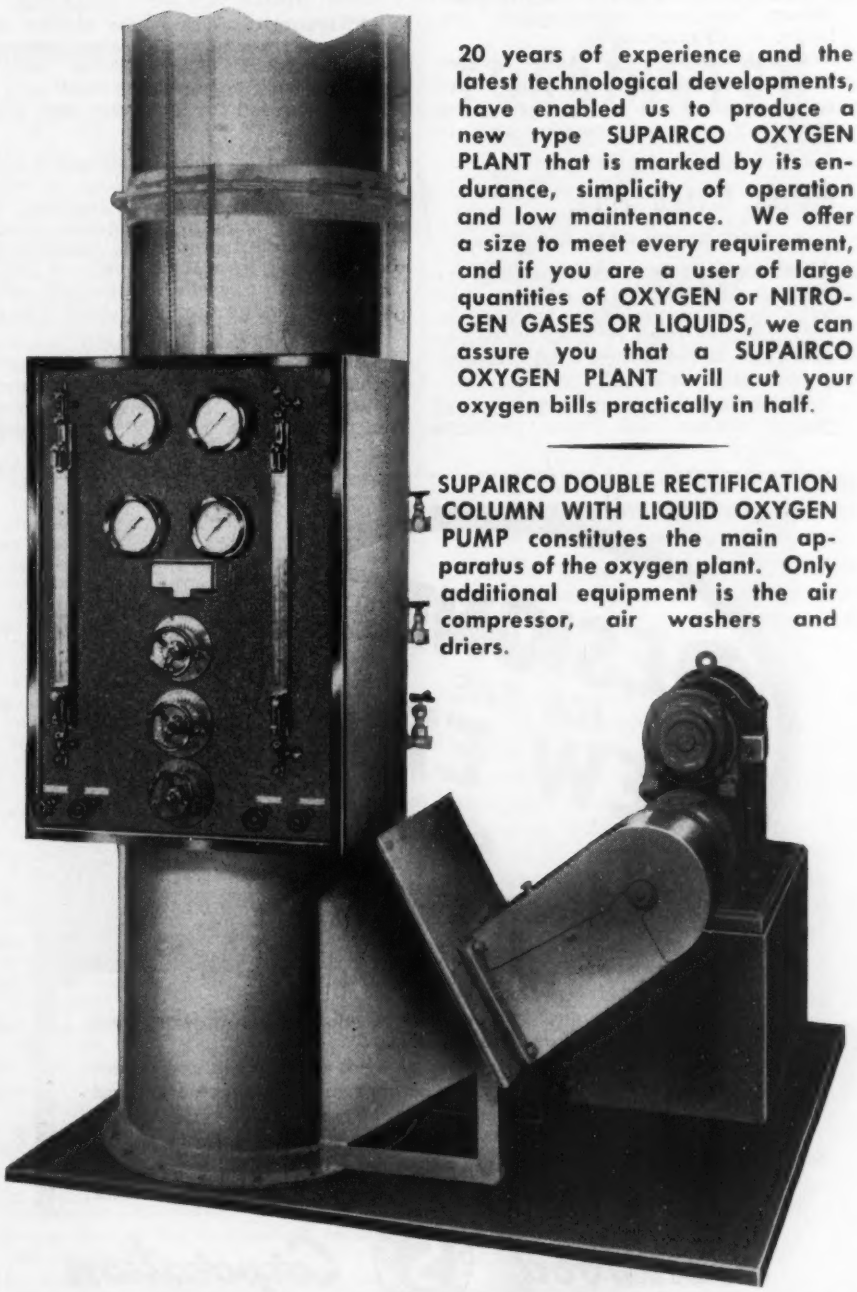

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moving at $40.50-$41.50. Rerolling and random rails are $1 higher.

St. Louis—Scrap sales are limited. Dealers are refusing new commitments at old prices. Shipments are light with collectors holding out for higher prices. Consumers are showing more interest in requirements.

Birmingham—Scrap is moderately active with heavy melting and the better grades of cast in greater demand. Somewhat increased tonnage is moving in by truck.

Los Angeles—Mills are limiting purchases of scrap to preferred items. Demand is steady for No. 1 and No. 2 heavy melting; soft on turnings. Bethlehem Pacific Coast Steel Corp. is buying heavily.

San Francisco—Mill buying continues restricted. Stockpiles are large, prices unchanged.

Seattle—Scrap is static, prices holding unchanged. Supplies are ample with mills not ordering for inventory. No. 1 cupola cast is $25-$30.

Rails, Cars . . .

Track Material Prices, Page 133

Philadelphia—Contributing to expansion of backlogs at eastern steel mills is an appreciable increase in specifications from railroad shops for new car construction and repairs, particularly the latter.

Pittsburgh—Heavier movement of plates, shapes and other products into railroad consumption is expected as logical outcome of Equitable Life Assurance Society's plan (STEEL, p. 66, Apr. 3) for purchase of railroad freight cars for leasing to railroads.

Birmingham—Louisville & Nashville Railroad has doubled its original order for 500 cars with the Bessemer plant of Pullman-Standard Car Mfg. Co.

Warehouse . . .

Warehouse Prices, Page 135

Philadelphia—Some leading warehouses report an increase of 10 to 15 per cent in March bookings and are anticipating even more active business in April.

Pittsburgh—Warehouse stocks of sheets, strip and wide flange beams are inadequate for essential needs of some customers. Some mill deliveries promised for February still are unshipped.

Cleveland—Local warehouses report an encouraging pickup in volume. Seasonal upturn in building is stimulating some new demands. Also, general manufacturing is increasing as reflected in a March gain of 2600 to factory payrolls, industrial employment in greater Cleveland rising to 190,800.

Birmingham—Warehouses report steady business in most product classifications. Suppliers are short in some items, notably sheets, and some bar sizes. Plates are in better supply.

Los Angeles—Activity at the warehouse level continues to mount. Distributors' optimism is tempered by lengthening in delivery schedules on nearly all items. Delivered prices on warehouse products have increased.

San Francisco—Buying is spotty but improved. Sharp competition continues. Considerable price shading is reported.

Seattle—Warehouse volume is heavier but demand is spotty. Stocks are in good shape. Nails and sheets are tight, but distributors report supplies sufficient to care for current needs.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

6500 tons, Foster St. state bridge, Harrisburg, Pa., through Booth & Flynn, Pittsburgh, to Bethlehem Steel Co.

2800 tons, Morses Creek bridge, state turnpike authority, Linden, N. J., through Delbalso Construction Co., Bronx, New York, to Harris Structural Steel Co., that city.

2200 tons, state hospital, Utica, N. Y., to Bethlehem Steel Co.

900 tons, two steel stringer bridges, Boston-Somerville, Sullivan Square project, to Groisser & Shlager Iron Works, Somerville, through Westcott Construction Co., North Attleboro, Mass., general contractor.

800 tons, building, state Agricultural College, Farmingdale, N. Y., to Lehigh Structural Steel Co., Allentown, Pa.

650 tons, H-piles, Navy Department, to Bethlehem Steel Export Corp., New York, $51,133.06.

500 tons, Montana state Trout Creek bridge, to American Bridge Co., Pittsburgh; Hansen & Parr Construction Co., Spokane, Wash., general contract, low $392,604.

425 tons, Memorial Hospital building, New York, to Grand Iron Works, that city.

300 tons, pulp and paper mill expansions in Washington state, to Isaacson Iron Works, Seattle.

300 tons, Washington state bridges, Grays Harbor county, to Consolidated Western Steel Corp., Seattle; Sealand Construction Co., Seattle, general contract, low $235,748.

180 tons, gymnasium, Tilton Academy, Tilton, N. H., to Luria Steel & Trading Co., New York.

110 tons, school, Hanson, Mass., to West End Iron Works, Cambridge, Mass., through Platt Construction Co., Cambridge, general contractor.

STRUCTURAL STEEL PENDING

22,000 tons, Passaic river bridge, Essex and Hudson counties, New Jersey, State Turnpike Commission; bids Apr. 27.

15,000 tons, Hackensack river crossing, Hudson county, New Jersey, State Turnpike Commission; bids May 4.

10,300 tons, H-piles, pier, Mystic terminal, Boston; bids Apr. 26, Port of Boston Authority.

5000 tons, state turnpike bridge, Allegheny county, Pennsylvania; American Bridge Co., Pittsburgh, low.

4700 tons, Belle Vernon state bridge, western Pennsylvania; Fort Pitt Bridge Works, Pittsburgh, low bidder.

3300 tons, viaduct, Moon and Long islands, Boston Harbor, Boston; bids Apr. 11.

1600 tons, superstructure, pier, Mystic terminal, Boston; bids Apr. 26, Port of Boston Authority.

700 tons, Somerset county administration building, Somerville, N. J.; Oltmer Iron Works, Jersey City, N. J., apparent low bidder.

650 tons, school 184, Queens, New York; bids Apr. 18.

560 tons, state highway bridges, Uxbridge,

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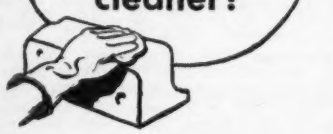

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Mass.; G. Rotondi & Sons, Melrose, Mass., low on general contract.

500 tons, administration building, state hospital, Hollidaysburg, Pa.; bids Apr. 19.

350 tons, state highway bridges, Plymouth, Mass.; M. DeMatteo Construction Co., Quincy, Mass., low on general contract, Apr. 4, Boston.

300 tons, plant addition, Fairbanks, Morse & Co., Beloit, Wis.; Stone & Webster Engineering Corp., Boston, contractor-engineer.

230 tons, state bridge, Warren county, New Jersey; A. S. Wickstrom, Skaneateles, N. Y., low on general contract.

200 tons, state hospital addition and boiler house, Hollidaysburg, Pa.; bids Apr. 12.

160 tons, state bridge, Delaware county, Pennsylvania; bids Apr. 28.

Unstated, Project P/44, Clallam county, Washington; general contract to Hall-Atwater Co., Seattle, low $761,501, to U. S. Engineer, Seattle.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1470 tons, Pennsylvania Turnpike, Allegheny county, Pa., to Bethlehem Steel Co.

625 tons, Pennsylvania Turnpike, Henderson, Pa., to Taylor-Davis.

500 tons, Blockson Chemical Co., Joliet, Ill., to United States Steel Supply Co.

426 tons, flood protection wall, Ashland, Ky., to United States Steel Supply Co.

385 tons, H. J. Heinz Co., Pittsburgh, to Dambaugh Co.

285 tons, bridge, Indianapolis, to A. J. Baker.

275 tons, Republic Publishing Co. plant, Yakima, Wash., to Northwest Steel Rolling Mills Inc., Seattle; Howard S. Wright & Co., Seattle, general contract.

275 tons, waterworks, Bowling Green, O., to Pollock Co., Youngstown.

200 tons, two state bridges, Boston-Somerville, Mass., to Northern Steel Co., Boston, through Westcott Construction Co., North Attleboro, Mass., general contractor.

140 tons, Van Asselt public school, Seattle, to Bethlehem Pacific Coast Steel Corp., Seattle; Caudry & Viemo, Seattle, general contract.

100 tons, Washington state highway bridges, Grays Harbor county, to Bethlehem Pacific Coast Steel Corp., Seattle; Sealand Construction Co., Seattle, general contract.

80 tons, school, Hanson, Mass., to West End Iron Works, Cambridge, Mass., through Platt Construction Co., Cambridge, general contractor.

REINFORCING BARS PENDING

1550 tons, sewage treatment plant, Canton, O.; bids asked.

1000 tons, factory, Nash Motors, Kenosha, Wis.; bids asked.

995 tons, building for Veterans Administration, Cincinnati; bids asked.

550 tons, state highway and bridges, Plymouth, Mass.; bids in.

440 tons, Congress Street bridge, Chicago; bids asked.

360 tons, pumping station, Covington, Ky.; bids asked.

240 tons, water works, Milwaukee; bids asked.

230 tons, state highway and bridges, Lexington-Waltham, Mass.; Henry Worthington, Quincy, Mass., general contractor.

180 tons, parking deck, Ben Alpert Inc., Chicago; bids asked.

165 tons, Illinois Bell Telephone Co., Chicago Heights, Ill.; bids asked.

140 tons, Prospect Heights apartment, Milwaukee; bids asked.

128 tons, apartment, 1500 Hinman Ave., Evanston, Ill.; bids asked.

125 tons, state highway and bridges, Sturbridge, Mass.; White Oaks Construction Co., Plainville, Conn., general contractor.

100 tons or more, maintenance building for Seattle light department; W. G. Clark Co., Seattle, general contract, low $91,401.

100 tons, irrigation division headquarters, Bureau of Reclamation; W. W. Harpfst Co.,

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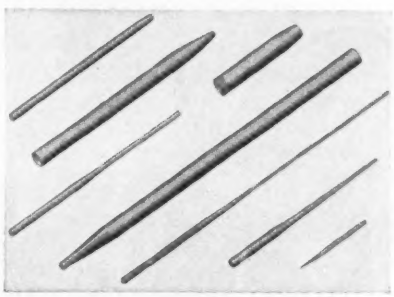

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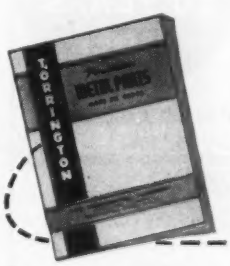

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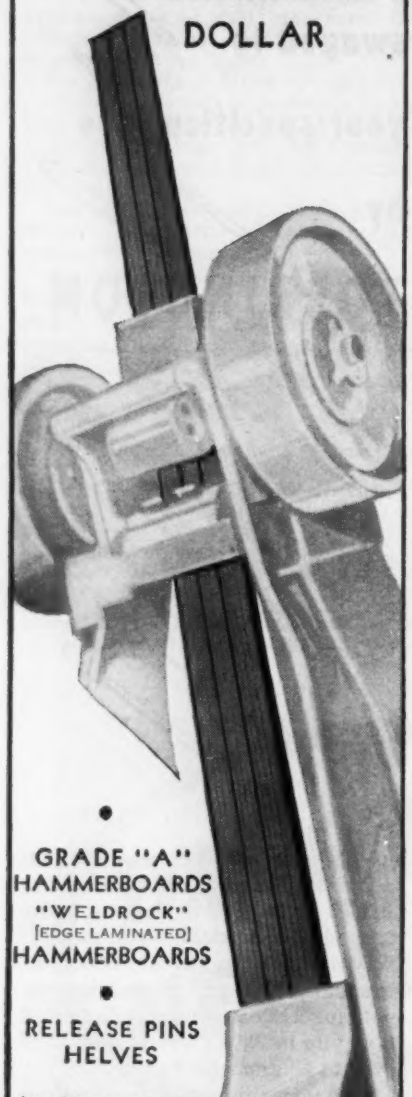

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Seattle, low $472,192.

100 tons, Memorial Stadium, Joliet, Ill.; bids asked.

PLATES . . .

PLATES PLACED

200 tons, including shapes, two tugs and two cargo barges, to Weldcraft Steel Co. and Weldit Tank & Steel Co., Bellingham, Wash., H. C. Hanson, Seattle, naval architect.

100 tons, including shapes, two 60-foot fish barges, for New England Fish Co., Seattle, to Flohr & Co., Seattle.

PLATES PENDING

4530 tons, straight web, steel sheet piling, for Chief Joseph dam; bids to U. S. Engineer, Seattle, Apr. 13; spec. No. 50-68.

665 tons, hull plate steel, various deliveries, Navy Department; bids Apr. 18, inv. 2534.

400 tons, Lookout Point dam penstocks; bids to U. S. Engineer, Portland, Oreg., Apr. 20.

170 tons, standard welding steel T piling, Chief Joseph dam; bids to U. S. Engineer, Seattle, Apr. 13.

100 tons or more, two liquid cargo deck barges, 4160-bbl capacity each, Army Transportation Corps., Marietta, Pa.; bids Apr. 11.

PIPE . . .

CAST IRON PIPE PENDING

1100 tons, 16 and 24-inch; Revere-Malden, Mass.; bids Apr. 20, Metropolitan District Commission, Boston.

250 tons, 6 in. cast iron pipe, system extension; bids in Apr. 3 to Fred T. Hofman, city clerk, Ellensburg, Wash.

RAILS, CARS . . .

RAILROAD CARS PLACED

Equitable Life Assurance Society of the United States, 1300 freight cars for leasing to Atlantic Coast Line, to Pullman-Standard Car Mfg. Co., Chicago, for construction at Birmingham; list comprises 700 fifty-ton wood pulp cars and 600 seventy-ton covered hopper cars.

Lehigh Valley, noted in last week's issue as having placed 1000 box cars to Bethlehem Steel Co., Bethlehem, Pa., and 500 box cars to an unnamed builder, placed the latter with Pullman-Standard Car Mfg. Co., Chicago.

Louisville & Nashville, 500 fifty-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago. This is in addition to an identical order placed in January.

FERROALLOYS

(Continued from Page 135)

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., 8MxD, bulk, 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lots 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 20.50c per lb of contained chromium plus 11.30c per pound of contained silicon; 1" x down, bulk, 20.65c per pound of contained chromium plus 11.50c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

Silicon Alloys

25-30% Ferrosilicon: Contract, carload, lump, bulk, 17.00c per lb of contained Si; packed 18.40c; ton lot 19.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15.0c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l. lump, bulk, regular 19.0c per lb of Si, c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.65c per lb of alloy, ton lots packed 9.05c, 200 to 1999 lb 9.40c, smaller lots 9.90c. Delivered. Spot up 0.5c.

• Briquetted Alloys

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.
(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching small size ony. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

Calcium Alloys

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%.) Contract, carload lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

Titanium Alloys

Ferrotitanium, Low-Carbon: (Ti 25-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.28, less ton $1.35, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $160 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%.) Contract, $175 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

Vanadium Alloys

Ferrovanadium: Open-Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.) Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c, **Crucible-Special Grades** (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.) $3.10.

Grainal: Vanadium Grainal No. 1, 93c; No. 6 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.20 per lb contained V_2O_5, freight allowed. Spot, add 5c.

Tungsten Alloys

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

Zirconium Alloys

12-15% **Zirconium Alloys:** (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% **Zirconium Alloy:** (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract carload, lump, packed 20.25c per lb of alloy ton lot 21c, less ton 22.25c. Freight alowed. Spot, add 0.25c.

Boron Alloys

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c F.o.b. Washintgon, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $4.25 per lb contained B, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots,. 50c per lb.

Carbortam: (B 1 to 2% contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., frt allowed same as high-carbon ferrotitanium.

Other Ferroalloys

Ferrocolumbium: (Cb 50-60%, Si 8% max., C 0.4% max.). Contract, ton lot, 2" x D, $3.50 per lb of contained Cb, less ton $3.55. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min. C 0.30 max.) ton lots, 2" x D, $2.67 per lb of contained Cb plus Ta, delivered; less ton lots $2.72.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lots 17.50c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.00c per lb of alloy; ton lots 18.00c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Lump, bulk, carload 11.00c. Ton lots, bulk 11.50c, packed 11.75c. Less ton lots, packed 12.25c per lb of alloy, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. seller's works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity $1.13.

Technical Molybdic-Oxide: Per lb, contained Mo., f.o.b. Langeloth and Washington, Pa., packed in bags containing 20 lb of molybdenum, 95.00c.

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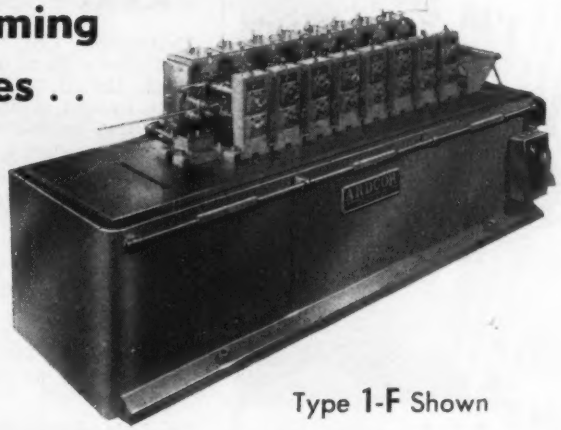

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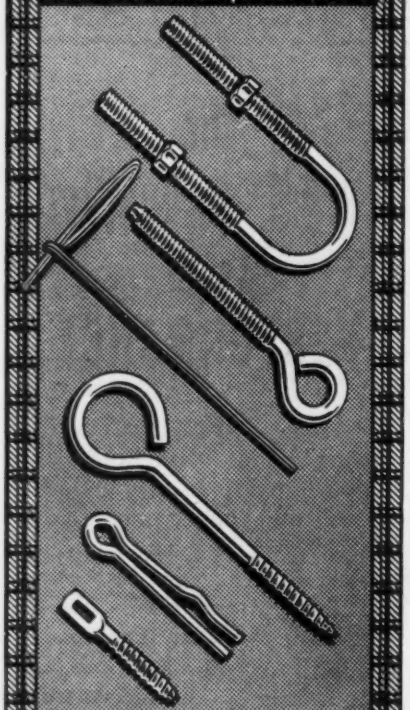

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Metalworking Briefs

CONSTRUCTION, ENTERPRISE
ORGANIZATIONAL CHANGES

Alabama

Trailmobile Co., Cincinnati, has established a plant in Birmingham. W. Cecil Griffin is resident manager. Only special equipment will be manufactured in the new plant initially.

California

District Steel & Equipment Co. moved its offices to 5248 Sheila St., Los Angeles 22.

California

Hammond Mfg. Corp. changed its location from 6161 Maywood Ave., Huntington Park, Calif., to 2710 E. Foothill Blvd., Pasadena, Calif. The company has increased manufacturing facilities at the new location.

California

Gil-Lair Products Inc.—pipe couplings and industrial hose—Pasadena, Calif., appoints the following representatives: Tom S. Andrews, Oklahoma City, Okla.; Application Co., New York; W. Philip Cox, Washington; H. A. Ferguson, Baton Rouge, La.; Edwards & Son, Pittsburgh; Walter J. Ottinger, Toledo; Keystone Tool Corp., Houston; Paul B. Mueller Co., Minneapolis. Allied Supply Co., Los Angeles, and Mission Pipe & Supply Co., San Diego, Calif., are named selected stocking distributors in their areas.

California

General Controls Corp. is constructing a $100,000 addition to its plant at Glendale, Calif. The new facilities will be devoted to assembly operations of the company's automatic pressure, temperature, level and flow controls.

California

Alameda Foundry, a newly organized firm in Alameda, Calif., took over the facilities of **Pitchometer Propeller Co.** and will produce manganese-bronze ship propellers and other nonferrous ship fittings.

California

Lee B. Mettler Co. moved its general office and factory into its new building at 4366 Worth St., Los Angeles 63.

District of Columbia

American Coke & Coal Chemicals Institute moved its headquarters to Suite 919, 711 Fourteenth St., N.W., Washington.

Georgia

Combination warehouse and office building to serve as district headquarters of the **Kroger Co.** in Atlanta is being designed and constructed by **Rust Engineering Co.** of Birmingham and Pittsburgh.

Illinois

Borg-Warner Corp., Chicago, will transfer later this year all manufacturing and administrative activities of its Marvel-Schebler Carburetor Division from Flint, Mich., to Decatur, Ill. Improvements and alterations to the Decatur plant leased from **Mueller Co.** will be started shortly. Negotiations are under way for sale of the Flint facilities to **E. I. du Pont de Nemours & Co.,** Wilmington, Del.

Illinois

Abell-Howe Co., Chicago, appoints as distributors of overhead cranes, monorail systems, hoists and steel storage racks: **Albert H. Cayne Equipment Corp.,** New York; **William R. Bauer & Co.,** Pittsburgh; **Product Handling Equipment Co.,** Cleveland; **E. G. Artz Inc.,** Milwaukee; **J. Harry Greer,** Kansas City, Mo.

Illinois

Pressed Steel Car Co. Inc. has moved its purchasing offices from McKees Rocks, Pa., to its Mt. Vernon Car Mfg. Division, Mt. Vernon, Ill.

Kentucky

Reynolds Metals Co., Louisville, appoints the following distributors to handle the company's general line of aluminum mill products: **Mutual Mfg. & Supply Co.,** Cincinnati; **American Steel & Alloys Corp.,** Hartford, Conn.; **Merchant & Evans Co.,** Philadelphia; **Athos Steel Service Co.,** Philadelphia. **Potts-Farrington Co.** is still active in the Philadelphia district. The following firms are appointed distributors for pig and ingot products: **Silverstein & Pinsoff Inc.,** Chicago; **Rochester Smelting & Refining Co.,** Rochester and Buffalo; **Atlas Metal Co.,** Cleveland.

Maryland

R. P. Adams Co.—filters and separators—Buffalo, appoints **Machinery & Equipment Sales Inc.,** 1014 Cathedral St., Baltimore, as its representative in Maryland.

Maryland

Mathieson Chemical Corp., Baltimore, and **Tennessee Gas Transmission Co.** have organized a $25 million subsidiary company, to build a plant near Louisville, for manufacture of hydrocarbon chemicals.

Massachusetts

Federal Machine & Welder Co., Warren, O., appointed **Austin-Hastings Co. Inc.,** Cambridge, Mass., as representative for New England.

Michigan

Bigelow-Liptak Corp.—industrial furnace enclosures and industrial insulation—Detroit, established a sales office in Tulsa, Okla., under the supervision of Charles F. Koos. The company has established an office also in Portland, Oreg., under the supervision of J. A. Schruefer. Bigelow-Liptak has named Armin O. Schleiffarth as its St. Louis representative.

Michigan

Diehl Mfg. Co., electrical division of **Singer Mfg. Co.,** opened an office and warehouse in the new Singer building, 5900 Second Blvd., Detroit 2, under management of James E. Ryan.

Michigan

Tools & Supplies Inc., 3131 Olive St., St. Louis 3, and **Erie Mfg. & Supply Co.,** 1215 Peach St., Erie, Pa., are designated authorized distributors by Carboloy Co. Inc., Detroit. Carboloy standard tools, standard blanks, carbide tipped masonry drills, and diamond impregnated carbide wheel dressers will be carried in stock.

Nevada

Union Pacific Railroad shortly will start a $300,000 expansion of its yards at Las Vegas, Nev., to prepare for an expected increase in freight traffic when several new industries begin operations at a nearby magnesium plant.

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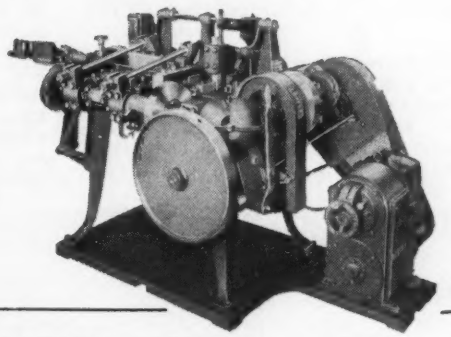

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The illustration shows one of the many units we manufacture. These reels, made in stationary and tilting models from 75 to 500 lbs. capacity, can be used for either wire or coiled metal. Special types are available.

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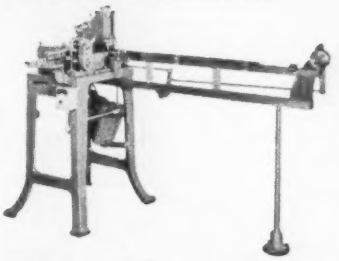
Completely automatic, they form, cement and cut to sticks of any desired length. Nilson Staple Forming Machine can be tooled for standard office and special size staples with square, chisel or divergent points.



All inquiries concerning Nilson Products will be given prompt attention and full data will be forwarded upon request.

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New Jersey

American Platinum Works, Newark, N. J., manufacturer and fabricator of precious metals, appoints **Fort Duquesne Steel Co.,** Pittsburgh, and **Hamilton Steel Co.,** Cleveland, as distributors of its silver brazing alloys.

New York

Farrel-Birmingham Co. Inc. is moving its gear sales division (which was located at the company's Buffalo plant) and the marine sales division (presently connected with the New York office) to its main offices at Ansonia, Conn.

New York

New York Car Wheel Co., Buffalo, purchased **Albany Car Wheel Co.,** Albany, N. Y. Operations will continue unchanged at the Albany plant.

Ohio

Indianapolis Machinery & Supply Co. Inc. purchased the property and equipment of the City Engineering Co., Dayton, O. The machinery consists of heavy equipment designed for heavy tool items.

Ohio

Kustom Kitchens Inc., W. Jefferson, O., was incorporated to manufacture and deal in prefabricated kitchen cabinets, sinks, etc. The company was organized by Don C. Hanover, Vernon L. Stouffer and Larry J. Kaho, statutory agent, 73 Fellows Ave.

Ohio

Dravo Corp., Pittsburgh, will convert two buildings purchased in Marietta, O., into a pipe fabricating plant.

Ohio

Youngstown Steel Products Co., representing the **Youngstown Sheet & Tube Co.,** designated four former suboffices as district sales offices. Men in charge of these offices are designated district sales managers: E. N. Hagstron at Grand Rapids, Mich.; W. J. Burt at Des Moines, Iowa; J. J. McMahon at Milwaukee; and Charles S. Hogan at Minneapolis.

Ohio

Armco Drainage & Metal Products Inc., a subsidiary of **Armco Steel Corp.,** Middletown, O., is constructing a $250,000 culvert manufacturing plant near Washington Court House, O. A. H. Hutton is the project engineer in charge of constructing the plant.

Pennsylvania

Composite Steels Co., Washington, Pa., purchased a building in Wilmington, Del., and is moving into the new facilities. The company will polish steel heads and plates which will be received from the **Worth Steel Co.,** Claymont, Del., and **Bethlehem Steel Co.'s** Sparrows Point, Md., plant.

Pennsylvania

Corry-Jamestown Mfg. Corp., Corry, Pa., will build a $1 million plant for the manufacture of steel desks. The plant is scheduled for completion in 1951.

Pennsylvania

Miller Steel Sales Inc. moved its office and warehouse to its new building at Cedar and Cambria streets, Philadelphia 34.

Pennsylvania

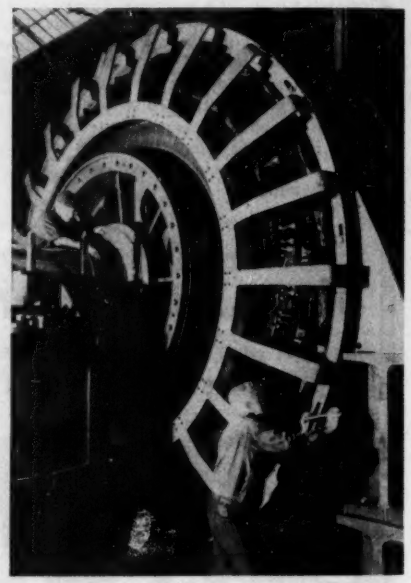
Lukens Steel Co. and its divisions, By-Products Steel Co. and Lukenweld, Coatesville, Pa., opened a district sales office in Los Angeles under the management of D. Earl McElroy. C. T. Hansen & Co., which had been sales representative for Lukens in the Los Angeles district, will confine activities for the firm to San Francisco and Seattle areas.

Pennsylvania

Dravo Corp., Pittsburgh, awarded a contract to air condition the 40-story building now under construction at 525 William Penn Pl., Pittsburgh, which will be occupied by United States Steel Corp. subsidiaries and Mellon National Bank & Trust Co. The contract was awarded by Turner Construction Co., general contractor for the building. Associated architects are W. K. Harrison, M. Abramovitz and W. Y. Cocken.

Pennsylvania

Stenzel & Co., 25 Richard Wagner St., Weisbaden, Germany, was appointed **Kennametal Inc.,** Latrobe, Pa., representative in Western Germany.



COPPER CUSTOMER: This 3000-hp motor, thought to be the largest mine hoist motor in physical size ever built in this country, is shown being assembled for test at General Electric's Schenectady, N. Y., works. It is capable of lifting 12 tons of ore nearly half a mile a minute. It was shipped to Anaconda Copper Mining Co. at Butte, Mont.

Pennsylvania

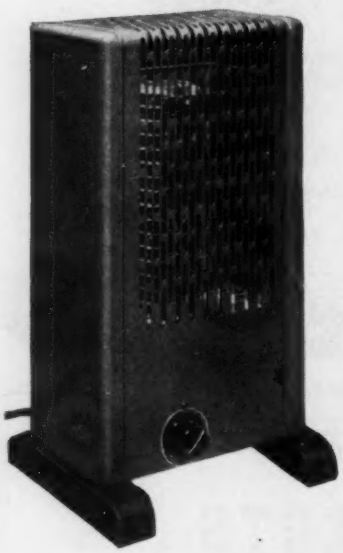
E. W. Bliss Co. appoints **Steel City Tool & Machinery Co. Inc.,** 1014 Plaza Bldg., Pittsburgh, as sales representative for mechanical and hydraulic presses in portions of western Pennsylvania and southeastern Ohio. Coincident to this move, Bliss is closing its sales office at Pittsburgh.

Washington

Offices of the northwestern division, Pacific Coast branch, **National Lead Co.,** have been moved from Portland, Oreg., to Seattle. W. C. Minsinger is division manager in Seattle and Roy T. Malott is manager of the Portland office.

Wisconsin

A. O. Smith Corp., Milwaukee, established a Washington office at 319 Mayflower Office Bldg. Shelby S. Walker, previously the company's Philadelphia manager, is in charge.



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